THE IRON AGE

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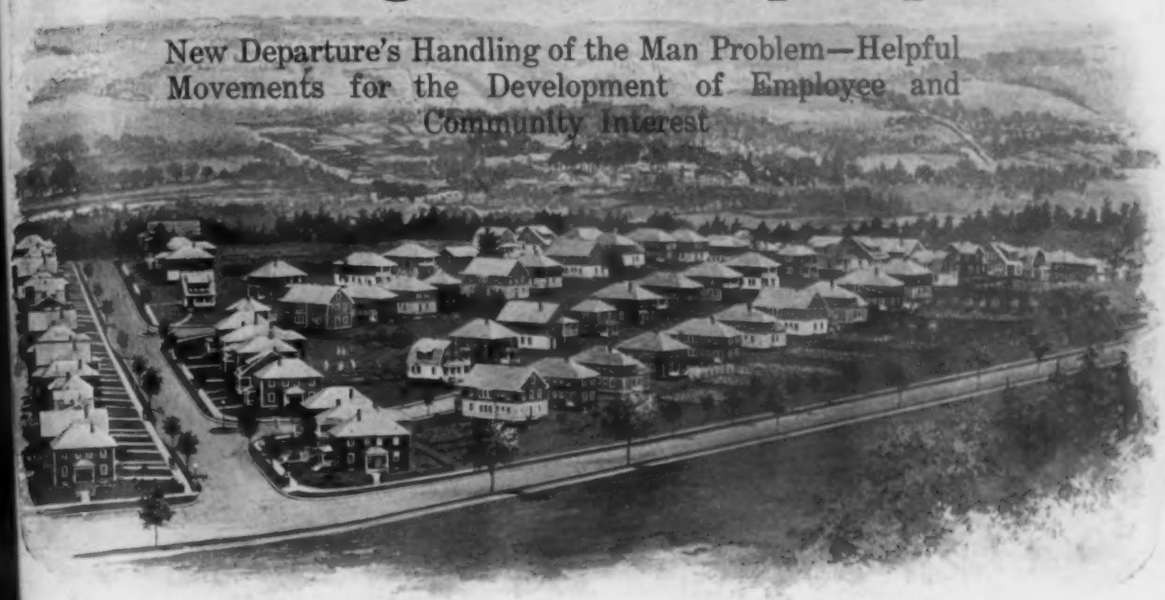
Fostering the Shop Spirit

New Departure's Handling of the Man Problem—Helpful Movements for the Development of Employee and Community Interest



BY W. E. FREELAND

A BIG factory in a little city has its own big problems. If it has grown so large that in a measure it dominates the town, it has also its big responsibilities. This is the present situation of the New Departure Mfg. Co., maker of ball bearings, at Bristol, Conn., a city of less than 25,000 people. The proportion of growth of the factory in the last three years has been almost ten to one of that of the town. So it can be readily seen that the problems of welding a large accretion to its original working force, of housing the many families brought into the town, and of developing many things in the community at large have had to be met.

Back of such growth lies an interesting story of industrial development. The New Departure Mfg. Co. was incorporated June 27, 1889, and its original product was the older types of mechanical door-bells. Out of this business grew the manufacture of the New Departure bicycle bells, so well known to men now of middle age. Later came the development of the coaster brake, perhaps the most important factor in bringing the bicycle back into popularity after the near dissolution of the bicycle industry in the early years of the present century.

In 1906 the manufacture of ball bearings was taken up. This has now become the major interest of the company, although the output of coaster brakes and bells continues to be an important part of the yearly production.

One of the things that has promoted the growth of the company, aside from the constant betterment of product, has been its continued and finally successful effort to change the character of ball-bearing measurements from a multitude of special sizes to the standard sizes which now prevail. Prior to the outbreak of the European war the company had a ball bearing plant that seemed adequate for the growth of several years. Then machinery and motor conveyances of all kinds were ordered in enormous quantities. The ball bearing business received an impetus that swept away all preconceived ideas of factory expansion.

In the two years between June 30, 1915, and June 30, 1917, the company was compelled to add to its factory until it had doubled the value of its plant investment and tripled its output. A series of buildings was added. First came a grinding plant which is believed to house more grinding machines than are assembled under one roof anywhere else. Then a steel ball plant was added that has a capacity of 25,000,000 steel balls a day. It is also building a big structure alongside the railroad track, locally known as the Terminal building, which will house over $1,000,000 worth of steel stock and a large equipment of the machinery used in the initial processes of manufacture, as well as the packing and shipping facilities for the finished product.

While this story pertains principally to plant A at Bristol, the company also has a plant in East Bristol, known as plant B, where bells are made, and another plant, C, at Elmwood, a suburb of Hartford, engaged principally in the making of the smaller sizes of bearings.

102 Houses in 102 Days

Naturally, in the rapid growth of the plant, the

housing facilities of the town quickly proved inadequate. Then the company took up its own housing work through an auxiliary organization, the New Departure Realty Co. Twenty-two acres of land adjoining a city park formed the site for an extensive effort to overcome the housing difficulties. Streets and lots were graded, a somewhat difficult matter because of the hilly nature of the ground, and water, sewers, electricity and gas put throughout the tract, which is called Endee Manor. The work of building was begun in June, 1916, and the first house was occupied Oct. 17, the same year. In all, 102 houses were built in 102 days.

These houses are on lots 50 x 150 ft. and were designed by the company's engineers. All are of attractive design and well constructed and comprise about eleven different types, including quite a number of both the usual two-family house and the duplex, two-family house. The 102 houses have altogether 174 apartments of four to six rooms. They are both sold and rented. In case of sale the property is put under special rigid restrictions intended to keep the tract thoroughly residential and to prevent nuisances that would lower the value of neighboring property. The houses are all set back 20 ft. from the street and only people of the Caucasian race are permitted to live in them. When rented, the following rates prevail — four rooms, $14; five rooms, $16; single houses, $18. The rents are collected in advance.

Many of the Houses Are for Two Families

The sales plan has several interesting features. Varying initial payments are permitted, $100, however, being the minimum payment. A local bank takes a first mortgage at 5 per cent and the realty company a second mortgage at 6 per cent. Arrangements are made to pay off this second mortgage in ten years or less. The houses vary in price from $2,900 to $6,500, being sold at net cost, as there is no desire to make a profit. In the care of the property after purchase the company maintains no paternalistic attitude. The men are compelled to look after their own property as they would if they had built independently. The realty company pays for the fire insurance for the first three years. If the purchaser becomes ill, payments are extended, without interest, for a period of not over six months. The company carries life insurance of $3,000 on each purchaser and in case of his death within ten years an immediate cash payment of $500 is made to his family and such other portion of the insurance money as is necessary is applied against the second mortgage, the surplus being turned over to the family in cash. The deeds carry a provision that the grantor has first option on the property, if the grantee desires to sell.

Office of Endee House, the Employees' Hotel

Endee House—An Employees' Hotel

The single man is a problem to every manufacturer. Just how he should be properly housed is nearly always a question. The manager of the realty company, L. A. Wheeler, maintains a record of all the available boarding places in the city and is able, because of the influence of the company, practically to put a stop to excessive charges for board and lodging. This method, however, proved to be only a partial solution and about a year ago the company bought the leading hotel in the city, the Gridley House, and turned it into a company hotel, changing its name to the Endee House. A portion of an adjoining building was taken over so that the present number of rooms is 74 and the usual number of lodgers from 100 to 110. Room and board cost a fixed sum of $7.50. Men who come to the hotel are required to give proof of actual employment or that they are negotiating for employment and are further required to make a deposit of $5. All the rooms are nicely furnished in the usual hotel style and the best rooms are awarded on the basis of a rating of the men's seniority and conduct. The house has 22 baths scattered about in various parts of the two buildings and 30 bowls with hot and cold water. There are iced drinking fountains on each floor.

Eleven Different Types of Houses Were Built

The street floor of the building is occupied by stores, above which is the large office with club features, pool tables, card tables, etc. Adjoining is a large room used as a writing and music room. Whist and pool tournaments are a part of the usual entertainment and a bowling club and other features add interest and promote acquaintance and good feeling among the men. Every Sunday there is a musicale, and another Sunday feature of much interest to the older men is the customary session of what has grown to be called the Amen Corner Club, where no subject is taboo and usually no agreement is reached upon any subject in the free-for-all discussions.

Section of the Office Is Equipped as a Club Room

One of the chief uses of the hotel is as a clearing house through which a constant stream of men can be kept circulating and kept happy until they find for themselves a home or boarding place to their taste. About 60 per cent of the men are single and some of these stay permanently at the hotel. As a rule the married men stay only long enough to locate a home to which they can bring their families.

Mutual Relief Association

Another way in which the employees of New Departure are drawn together is through the New Departure Mutual Relief Association. This was organized in 1904 and any male employee, 18 to 45 years old, who has been three months on the payroll, is eligible for membership upon approval of his application by the board of directors, which consists of nine men, selected from different departments. One dollar first payment is required and

The General Offices of the Company Are in This Building

50 cents a month during the first year. The rate continues at 50 cents at such times as there may be less than $1000 in the treasury, but when there is more than $1000, which is ordinarily the case, the dues are only 25 cents a month. Extra assessments can be made, but that has only been necessary twice in the history of the organization and those two instances were during its early days. The organization pays, beginning with the second week of illness, $1.50 for each working day, for not more than thirteen weeks in any one year. The death benefit is $50. The company does not contribute to the funds of the organization, which is run and supported through the efforts of the men themselves. One great means of adding to its funds is by conducting numerous social affairs.

One of the Floats in the Annual Picnic Parade

The most ambitious of these social affairs and the big event of the year for the employees is the annual barbecue held every fall. The company furnishes food, music, prizes and everything but the actual work. This year a considerable group of friends of the company enjoyed the affair and several reels of film were made by Pathe Weekly and other operators.

At the annual barbecue just held, 3500 people were seated in a grove eating at one time. The barbecue, which was really a sheep bake this year, was held on a Saturday afternoon and the employees worked until 11 o'clock. Then the New Departure band took its place opposite the administration building and filled in the hour before the parade with a concert. A parade of costumed marchers and floats passed through the main streets of the city, drawing a large crowd to the grove where the barbecue was to be held.

One unusual float, which won the first prize, carried 53 girls from the inspection department, who were dressed so that when seated on the rising tier of seats on the float they formed a United States flag. The men from the tin shop had composed themselves into a band with instruments made from tin plates. From the company's grinding department 30 deaf mutes organized themselves into a section of the parade and carried humorous signs.

The Girls' Inspection Department Won First Prize for Floats

Over 1000 employees of the company are members of the New Departure division of the Health Protective League, established a year ago, which has branches in several factories of Bristol. The work of this league is wholly against tuberculosis. The dues are $1 per year and the provisions for relief extend to the family of the employee as well as himself. A member becoming ill from this disease is given from $4 to $8 a week according to his needs, and if necessary is sent to the state sanitorium. The organization takes care of the families of members under such circumstances although there is no such obligation in the by-laws of the organization.

Social Activities of Fire Fighters

One of the interesting phases of the social side at the New Departure plant is the great success of the fire department, both in its purpose and as a social factor. It has its own business organization, a treasurer, bank account, kitchen and recreation room. The fire department is a live factor in building up good feeling and better acquaintance among the employees of the plant and between the employees of the plant and the citizens of the town. It has a chief and four assistants. Of these assistants one is a workman, another is the foreman of the piping department, a third the shop electrician, and the fourth the head of the safety department. Two companies are maintained, each of which has a foreman and assistant foreman, six regular men and six call men. There are also two men who are designated as fire police. The chief of the department is paid $50 a year; the

The Plant Fire Department and Part of Its Equipment

assistant chiefs, $40; foremen, $35; assistant foremen, $30; regular men, $25, and the call men for the actual time devoted to the work. Three men known as bunker men are paid $75 a year and given free lodging. These men never leave the plant without providing substitutes to take their places.

The factory buildings are equipped with sprinklers and standpipes. There is also a 1000-gal. steam pump arranged so that it can be operated in any one of three ways: in connection with the 8-in. city main, with the river or with a reservoir on a hill. This pump is also connected with a pump of the same size in a neighboring factory. Hydrants built according to standard insurance plans are scattered throughout the yard of the plant. Because of this good fire protection, not much heavy apparatus is needed. The portable fire-fighting equipment consists of three 50-gal. chemical tanks on wheels, one hose reel carrying 500 ft. of hose and a set of extension ladders. Hundreds of hand chemical tanks are scattered throughout the various buildings. The plant is equipped with a Gamewell alarm system having 35 boxes. The alarm system operates the factory whistle and bells and sirens in all the workrooms.

Weekly drills are held in the summer and there is keen competition between the two companies to see which will get the chemicals and hose-lines to a designated point first. In the winter the companies meet monthly for instruction in the handling of the apparatus and in the location of piping, hydrants, valves, etc. The men are fined $1 for absence from drill.

Control and Promotion of Athletics

In common with most companies, the New Departure Mfg. Co. has found it wise both to foster athletics and, in a measure, to control athletics and sports. It maintains teams in practically all the major sports and has inter-departmental teams in the more quiet sports like bowling. There is very great interest in the inter-factory contests. Such contests are, perhaps, more a feature in Connecticut than in any other state in the Union. For instance, there are several Connecticut factories that have baseball teams that are ready to try conclusions with any other amateur or professional team in the country at any time.

Other Service Departments

The employment, safety and medical deparments of the company are not dissimilar to those existing in most modern factories. Just at present all of these are in a state of flux because the growth of the factory is making radical changes necessary. The company is now engaged in installing a modern hospital department, in charge of a competent graduate physician and surgeon. This supplants a hospital that has been doing very effective work for some time and is only a step in the direction of extending the supervision of health and of medical inspection and services along a path that is expected to include not only the employee himself, but also in all probability his family. Modern safeguards are installed wherever the need is shown and a stream of suggestions for further safeguarding flows in to the head of the department.

The activities of the company in its social work and of the social organizations and protective organizations of the employees find expression in a lively shop paper called "The New Departure News," published weekly. This paper has been running about eight months and has established a place for itself in the minds of the workmen that makes it a vital part of the whole social fabric of the organization. Its editor-in-chief is DeWitt Page, president of the company, whose keen interest in their welfare is understood thoroughly by the older men who have grown up in the business with him and who form the most efficient missionaries among the new men for the building up of good will within the entire organization. Its managing editor is Charles F. Olin, advertising manager, who has also seen the company grow from a group of 300 or 400 men to its present size. Today "New Departure News" is a real force in perpetuating the good spirit that now exists and in creating a community of interest of management and employee.

As the company grew so rapidly in the last two years, drawing to itself so many young men and young women, it became evident that something must be done for the young people and for the older ones as well. A little study showed, however, that other factories in the town were also growing rapidly and drawing men to the little over-burdened community. Out of this has sprung the organization of a Community Club and the gathering of a fund of $250,000, more than half of which has come from the New Departure Company and its employees, to build a clubhouse. President Page was a leader in bringing this about. The work of the organization is for the benefit of men, women and boys, along the line of the Y. M. C. A. or Y. W. C. A., but without emphasis on the religious features. The building will have separate sets of rooms for men, women and boys, including parlors, reading, writing and game rooms. There will be dormitories, class rooms, a gymnasium, swimming pool and a theatre seating 2000 people.

Enough has been said to show that Bristol is rising to meet its needs and that the New Departure Mfg. Co., which has been such a factor in creating these needs, is doing its share, not only for its own people but for the community as well. Such a linking together of city and industry is one of the ideals toward which leading American industrialists are trying to point the way for all manufacturers.

First-Aid Work at Bethlehem Steel Co.

First-aid work at the Bethlehem Steel Co., South Bethlehem, Pa., is divided into two parts, according to a paper presented by J. R. Mulligan, assistant safety engineer of the company, at the recent National Safety Council meeting. It consists of training in the rescue of men from danger, treatment of shock, bandaging of wounds, etc., and also along another line which prevents injury to fellow employees by knowing the hazards of the various operations and guarding against them. Each shop has at least one first-aid team, which is given a course of instruction in first-aid work for 2 hr. per week for four months and a portion of this time is given over to the discussion of safe practices for the various operations of the plant. Three years of organized accident prevention work has shown an average reduction in the number of accidents of 28.38 per cent as compared with a similar period of unorganized work.

Price Fixing and Production

The National Foreign Trade Council discusses the principle underlying the co-ordination of price-fixing, taxation and the maintenance of foreign trade in a report which the council has submitted to the President and to Congress. The report was prepared for the Council's Committee on Banking Facilities for Foreign Trade by Lewis E. Pierson, chairman of the board of the Irving National Bank of New York. It recommends to the Administration and Congress the co-ordination of its efforts at price fixing and taxation upon principles that will stimulate production, insure the fullest maintenance of foreign trade and so provide a steady source of funds for the vigorous prosecution of the war.

The report declares that "the relation of price fixing and taxation to the maintenance and development of foreign and domestic trade in war times is direct and of the greatest force."

For converting dollars and cents into pounds Sterling and also into French currency, Edward LeBas & Co., 64 Broad Street, New York, have prepared two tables. They are designed particularly for insertion in catalogs.

IRON ORE FOR THROPP FURNACES

Prospect That Conneaut Will Be Made Available as a Shipping Port

WASHINGTON, Nov. 27.—A recommendation that the Pennsylvania and the Bessemer & Lake Erie Railroad be required to open Conneaut as a port from which merchant blast furnaces at Saxton and Earlston, Pa., may obtain iron ore has been made to the Interstate Commerce Commission by Charles F. Gerry, its attorney-examiner, who took the testimony in the complaint of Joseph E. Thropp vs. Bessemer & Lake Erie et al. His opinion is that the railroads mentioned should publish a rate of $1.375, plus the six cents per ton charge for transferring the ore from the rail of the vessel to the cars. Up to this time, the commission has always adopted and made the reports of its attorney examiners its own, hence the importance attached to this one which creates the prospect of a rate of $1.375 per ton from all lake ports to the furnaces near the southern border of Pennsylvania.

At present the Thropp furnaces are paying $1.60 per ton from Buffalo and Erie. The report says that for ore rate purposes these furnaces are in a group the easternmost limit of which is at Wharton, N. J., while for rate-making purposes on pig iron going to New England they are in the Johnstown group. Thropp can now obtain ore only at Buffalo and Erie because joint rates to his furnaces are published alone from those ports. Conneaut is 285 miles from his furnaces. The mileage to the other ports is substantially greater, but the Pennsylvania has rails from them to within a few miles of the Thropp furnaces. Presumably, it has made the rate adjustment so as to keep the tonnage on its own rails.

The proposed order is based on a finding that "in the present emergency" the $1.60 rate from Buffalo and Erie is not unreasonable or unduly discriminatory but that Thropp is entitled to a reasonable rate from the nearer port because there is a practicable route, composed of Bessemer & Lake Erie rails from Conneaut to Butler, Pa., and thence via the Pennsylvania's rails to the short roads leading to the Thropp furnaces.

Bessemer & Lake Erie Through Route

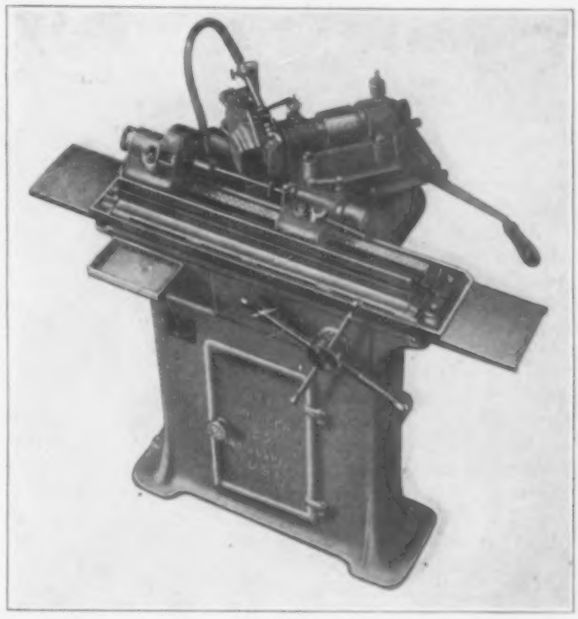
In the big iron ore rate case, in which a general readjustment was ordered, and the so-called "a la carte" system of stating rates on ore was introduced, the commission ordered the Bessemer & Lake Erie to establish a through route via Butler as the junction point. It said, however, that carriers from other ports might meet the rate made to Johnstown from Conneaut via Butler, if they so desired. They did so desire but the route via Butler was never established, because the furnaces did not care by what rails their ore moved. What they wanted and what they received was a rate based on the shorter mileage via Butler, regardless of the port. The commission acted on a conclusion that the carriers had not performed the legal duty placed on them to establish through routes and joint rates from Conneaut to Johnstown.

In his complaint Thropp set forth that for the 77-mile haul the ore receives from Pittsburgh to Johnstown the railroads charge only 12c. more than to Pittsburgh. For the 75-mile haul via one route from Johnstown to Saxton and Earlston and 90 miles via another, the railroads charge 51c. more than to Johnstown. On raw material Thropp and a considerable number of furnaces similarly situated were grouped with Wharton, N. J., while on finished product sent to New England they were grouped with Johnstown. The railroads retorted that as to the rate on pig iron to New England, Johnstown has the benefit of the competition, with them, of the more direct route of the Buffalo, Rochester & Pittsburgh. The furnaces in question are beyond the sphere of that influence.

In his original complaint, filed before the rate was advanced 15 cents, Thropp made no demand for reparation. At the hearing, however, he argued that because the commission allowed an advance notwithstanding his protest, it had in effect modified his demand so as to insert therein a prayer for reparation. That is a novel plea, says the report, based on an obviously untenable position. W. L. C.

A Recent Valve Seat Grinding Machine

The Ott Grinder Co., Indianapolis, has added a new machine to its line. Although designed especially for grinding the valve seats of internal-combustion engines



Internal Combustion Engine Valve Seats Can Be Ground at Any Angle Between 15 and 60 Deg. on a Recently Developed Machine

at a 45-deg. angle, the machine can be employed for similar work where the angle is between 15 and 60 deg., as a special wheelbase, operated by a hand lever, is provided.

A straight-faced wheel is employed, and is traversed across the valve seat, an arrangement which it is emphasized insures quick and accurate work. The traverse of the table is controlled by a handwheel of the capstan type.

If the machine is to be used with valve stems the heads of which have no centers, a draw-in collet chuck operated by a foot lever, to facilitate quick handling, is furnished.

Niles-Bement-Pond Co. to Build New Plant

The Niles-Bement-Pond Co., New York, has purchased 50 acres near Kearny, N. J., fronting on the Lincoln Highway and Hackensack River, and will build a plant for the manufacture of machine tools and cranes. The site is opposite that of the Federal Shipbuilding Co.'s new shipyard. The Niles-Bement-Pond Co. took an option on the property about six months ago and at that time it was understood that a plant would be built at once to assist the Government in providing large tools and cranes for war work. Fay Ingalls, secretary of the company, states to THE IRON AGE that plans have not definitely been made. He says that it is the intention of the company to build a new plant, but whether this will be completed in time to be of assistance in the war program depends upon how long the war lasts.

The Alloy Steel Works, Ltd., Toronto, Ont., recently incorporated, will take over the steel plant on Front Street East formerly operated by the Moffatt-Irving Steel Co. The new concern will continue to make steel castings by the electric-furnace process. It proposes to make considerable additions to its plant and to install an additional electric furnace. John R. Russell and H. T. Armstrong of Toronto are interested in the company, which is capitalized at $100,000.

Utilizing Domestic Manganese Supplies

Manganiferous Iron Ore in the Blast Furnace to Make Higher Manganese Iron—Conserving Manganese in Basic Open-Hearth Bath Metal

BY EDMUND NEWTON

THE difficulty in obtaining ferromanganese for steel manufacture has given some companies much concern. A careful analysis of the situation shows that, because we are depending almost entirely on imported manganese ores, the future quantities of available ferromanganese will be controlled largely by our ability to maintain such imports or to utilize our available domestic material to a larger extent than heretofore. If it were possible to utilize such domestic supplies to a greater extent, at the same time maintaining the quality and amount of our steel, we could do without a certain amount of imported ore and thereby divert ships to other purposes. How can this be done?

While we produced only a relatively small quantity of high grade manganese ore in 1916, we produced nearly 170,000 tons containing from 15 to 40 per cent manganese, and approximately 440,000 tons containing from 5 to 15 per cent manganese. Much of the 170,000 tons could be mixed with a certain amount of high grade ore and used to produce an alloy carrying from 40 to 60 per cent manganese. While the use of such material is not standard practice in this country, such alloys have apparently been used successfully on the continent, in England and in at least one steel plant in the western part of the United States, even in ordinary times. It is desirable to try to develop satisfactory practice for utilizing them, at least during the war.

The producers of domestic ores are trying hard to beneficiate these so as to make them more desirable for making alloys which are now used in standard practice. All logical and even very complicated processes are being investigated. In some cases these methods are successful, but in others the physical characteristics of the ores are such that relatively no improvement can be made.

Relative Amounts of Ferromanganese and Spiegel Now Used

Present metallurgical practice in the manufacture of ordinary steel consists in adding manganese in the form of ferromanganese or spiegeleisen at the end of the open-hearth "heat" or Bessemer "blow." The purpose of these additions is principally to remove oxide of iron (FeO) and some sulphur from the steel and also to impart certain desirable properties by virtue of the added manganese, which remains in the steel. Table 1, modified somewhat, from that of D. F. Hewitt, shows the relative amounts of ferromanganese and spiegeleisen used from 1912 to 1916 inclusive, the tonnages of metallic manganese contained in the same and the percentage of the total metallic manganese used in both alloys.

From this table, it is evident that in normal practice before the war, about 10 per cent of the total manganese was used in the form of spiegeleisen while 90 per cent was used in the form of ferromanganese. During 1915 and 1916, it is evident that the use of greater relative quantities has been practised.

Manganese in Basic Pig Iron

The data now available indicates that there are distinct advantages to be gained through an increased manganese content of pig iron used in the basic open-hearth process, although there is considerable difference of opinion among steel operators on this point. The American Iron and Steel Institute reported that in 1916 there were 29,616,658 gross tons of basic open-hearth steel produced in the United States out of a total steel production of 42,773,680 tons. In other words, nearly 70 per cent of the total steel was made by this process.

Until a few years ago in this country basic pig iron was usually specified to contain under 1 per cent manganese, for normal practice. Recently, some operators have been using considerably higher percentages of manganese. It is evident why our practice grew up around a manganese content of 1 per cent in basic pig iron. The average Lake Superior iron ores carry only about 0.70 per cent manganese which will produce a pig iron containing about 0.70 per cent manganese, assuming a 40 per cent loss in the blast furnace. Higher contents of manganese in the pig iron can only be obtained by mixing manganese or manganiferous iron ores.

The line of least resistance has been generally followed until recently, and the advantages of more manganese in the open-hearth have been disregarded in this country. Oddly enough, there appears to be little or nothing in our technical literature describing the behavior of manganese in the basic open-hearth. I have seen private reports by steel metallurgists that argue against the practice on the basis of certain tests made.

In certain European countries, even before the war, the amount of manganese contained in basic pig iron was considerably higher than that used in American practice. In some cases this was due to higher manganese in the iron ores and in others it was obtained by mixing manganese or manganiferous iron ores, because the foreign operators believed that certain distinct metallurgical advantages were gained by such practice. It is now generally realized in this country that manganese in the basic open-hearth tends to eliminate sulphur, to make the heats work better and offers certain other advantages.

Manganese Retained in the Basic Bath

Attention has also been called to the fact that manganese is not completely removed in the basic open-hearth, particularly when the original charge contained considerable manganese. Forsythe, in his book on the blast furnace, mentions this fact as a disadvantage in using a high manganese iron because the usual manganese addition may then produce too high a content in the steel. Campbell also speaks of it and says that "not only must this be allowed for but there will be less oxygen in the bath and consequently, a smaller loss of manganese in the ferromanganese addition."

This possibility of retaining manganese in the bath metal is important at the present time with our shortage of ferromanganese. If it is possible by using a fairly high manganese pig iron, to retain considerable residual manganese in the bath at tapping time, there would be a direct saving in the quantity of ferromanganese added. The manganese content of the pig iron could be increased by mixing manganiferous iron ores in the blast-furnace charge.

There seems to be considerable difference of opinion among American steel makers as to the possibility of retaining manganese in the bath under such conditions. In a report rendered by a committee of open-hearth men it was stated that when the manganese in the pig iron was approximately 1 per cent, the residual manganese in the bath was 0.14, while with a 2 per cent manganese pig, the residual manganese was only 0.18. On the other hand, I have talked personally with one metallurgical engineer of a large steel company who stated that it was practicable to economize ferromanganese in this manner if conditions in the open-hearth were properly controlled. He further stated that with from 2 to 2.25 per cent manganese in the pig iron it was possible to retain from 0.25 to 0.30 per cent residual manganese in the bath at tapping time. Another metallurgical engineer of a large steel com-

pany stated that a high manganese pig was advantageous for reducing sulphur and making cleaner heats but did not agree that it effected a saving in ferromanganese. On further questioning he admitted that, with 1 per cent manganese in the pig metal, the residual manganese would range from 0.10 to 0.14 per cent, whereas their practice, which was based on the use of 2 to 2.25 per cent manganese in the pig iron, produced an average residual manganese of 0.30 to 0.35 per cent. We have apparently conflicting testimony indicating that conditions are different in the various cases.

Effect of Large Amount of Manganese in Basic Practice

As already stated, there are practically no discussions on the behavior of manganese in the basic open-hearth in our literature. There is, however, in German literature and the Germans have apparenly realized the advantages for some time. Dichman* states that in either the basic open-hearth or basic Bessemer, satisfactory steel can be made without any additions of ferro-alloys at the end of the heat, if the raw materials of the charge are sufficiently high in manganese. Corroborating this statement, Cone† says:

> The German practice also involves the incorporation of 4 or 5 per cent manganese in basic open-hearth pig iron. To accomplish this, considerable manganese ore has been necessary, depending upon the manganese content in the iron ores from which this is made * * * The metallurgical reasons for so large a manganese content in Germany's basic open-hearth pig iron is the belief that a better steel is the result of the presence of so much manganese. This is without doubt correct and the practice is gaining favor in the United States in many quarters * * *.

Accounting for these facts, Dichman states that the manganese of the metal in the basic open-hearth will be oxidized by free FeO in the slag or bath and will form the silicate, $FeMnSiO_4$, which passes to the slag. If there is sufficient manganese present this action will continue until a state of equilibrium is established between the manganese of the slag and that of the metal. Also, the greater the quantity of manganese in the original metal, the sooner will this state of equilibrium take place.

Naske‡ states that manganese passes to the slag or reverts to the bath metal in the open-hearth, depending upon the relative amounts of manganese in the slag and metal and upon the temperature. A series of tests shows that when the manganese of the slag is less than that of the iron, the bath loses manganese. If the iron and manganese of the slag are equal, the manganese of the bath remains unchanged, while if the manganese exceeds the iron in the slag, manganese is reduced and passes back to the bath. Dichman also suggests that

> manganese acts as a powerful reducing agent upon the iron oxide of the slag or metal, returning iron to the bath while the manganese as MnO combines with silica and joins the slag. The slag can further only take up a specified maximum content of metallic oxides, and the more manganese contained in it, the less must its content of ferrous oxide become. Therefore, a slag rich in manganese oxide will contain less iron oxide and will not react as powerfully with the metallic manganese of the bath metal.

Obviously, there are then two tendencies at work—the manganese of the bath decreases more slowly and the exhaustion of ferrous oxide in the slag permits of the reduction of manganese from its oxide by the carbon of the bath. Manganese in the bath tends to destroy ferrous oxide contained in the metal, regarding which he makes the statement:

> One can, therefore, use manganese also as a preventive agent against red shortness (due to contained FeO) by means of large additions of manganese to the charge. This takes place nowadays in all cases where metal of the highest quality is to be manufactured.

Let us see how Dichman's explanation applies to our practice. It is, of course, necessary to have an oxidizing slag to act upon the carbon, silicon and phosphorus of the bath metal. Iron ore is often added during the heat to work out these impurities. If there is sufficient manganese in the charge to saturate the slag, we will have considerably less ferrous oxide contained in it, for that has been reduced by the manganese. The slag will contain practically as much oxygen on account of that combined with the manganese and will, therefore, have nearly as oxidizing an effect on the carbon, phosphorus and silicon as before, but not on the manganese of the bath.

While this theory is interesting, it is essential to make actual investigations in the laboratory covering the equilibria of open-hearth metal and slags and also confirm this with large-scale tests with a number of heats with pig iron containing from relatively small amounts through successive increases up to pig iron with large amounts of manganese. Samples of the bath metal and slag should be taken at intervals so that it would be possible to ascertain just what happens under a certain set of conditions; what the best conditions are for retaining residual manganese in the bath, and whether such conditions could be applied commercially at the present time without retarding practice or producing poorer steel.

The argument has been that this practice would be wasteful, because a large quantity of manganese would be lost to the slag. However, this manganese would be lost in accomplishing a useful purpose in preventing oxidation of the steel and in the amount of ferromanganese for this purpose.

Table 1—Metallic Manganese Used as Ferromanganese and Spiegeleisen in Steelmaking in the United States

Year	Ferromanganese, Gross Tons	Analysis, Per Cent Manganese	Metallic Manganese, Gross Tons	Spiegel, Gross Tons	Analysis, Per Cent Manganese	Metallic Manganese, Gross Tons	Metallic Manganese: Total Metallic Manganese, Gross Tons	Metallic Manganese: Per Cent in Ferromanganese	Metallic Manganese: Per Cent in Spiegel
1912	224,515	79.17	177,740	103,576	19.12	19 801	197,541	89.9[illegible]	10.02
1913	247,565	79.49	196,798	107,057	19.43	20.804	217,602	90.44	9.56
1914	183,728	79.36	145,806	79,495	19.76	15,705	161,511	90.28	9.72
1915	199,523	76.35	152,344	114,756	19.91	22,844	175,188	86.96	13.04
1916	286,225*	76.35†	218,533	197,518*	19.91†	39,326	257,859	84.75	15.25

*Statistics from IRON AGE, Feb. 8, 1917, p. 374.
†Analysis assumed to be the same as in previous year.

Manganiferous Ores in the Blast Furnace

Without considering the advantages gained in this practice by decreasing sulphur or making better steel, let us see whether it could be justified on the basis of saving ferromanganese. Certain manganiferous iron ores could be used to increase the manganese content of the pig iron. Material of this character could be obtained from the Cuyuna and Lake Superior ranges which on the natural basis analyze as given in Table 2.

Table 2—Analysis of Cuyuna and Lake Superior Ores

	Cuyuna, Per Cent	Lake Superior, Per Cent
Iron	33.86	51.30
Manganese	11.48	0.58
Silica	7.23	7.48
Alumina	2.98	2.20
Phosphorus	0.145	0.088
Lime	0.30	....
Magnesia	0.14	....
Ignition loss	8.50	....
Moisture	15.00	12.00

Assuming first that a pig iron containing 2.50 per cent manganese used as 50 per cent of our open-hearth mixture, we would have a residual manganese content in the bath metal of 0.25 per cent. Let us also assume that the steel to be made is specified at 0.50 per cent manganese. If, then, there was a loss of 40 per cent manganese in the blast furnace, a ton of pig iron con-

*Basic Open-Hearth Steel Process, Carl Dichman, p. 172.
†Edwin F. Cone, THE IRON AGE, Dec. 28, 1916, p. 1452.
‡"Chemistry of the Open Hearth Process"—Theodore Naske, *Stahl und Eisen*, vol. 27, pp. 157-161, 191-194, 229-236, 265-269.

taining 2.46 per cent manganese would be produced with the following ore mixture (natural basis):

Ores	Per Cent of Mixture	Weight, Pounds	Iron, Per Cent	Manganese, Per Cent
Cuyuna	14.44	618	33.36	11.48
Av. Lake Superior.	85.56	3,661	51.30	0.58
	100.00	4,279	48.71	2.15

In a ton of steel containing 0.50 per cent manganese there would be required 2240 × 0.50 = 11.20 lb. metallic manganese. With our assumption of a residual manganese content of 0.25 per cent, there would be actually in the bath at tapping time 2240 × 0.25 = 5.60 lb. metallic manganese, leaving 5.6 lb. of manganese which would have to be added, probably as ferromanganese at the end of the heat. The large quantity of residual manganese would indicate that the steel was not very highly oxidized and, therefore, there would be a smaller loss of manganese in the addition. We will assume, therefore, that in this case this loss will be 15 per cent. Therefore, 6.60 lb. metallic manganese should be added.

This would be equivalent to 8.25 lb. of 80 per cent ferromanganese per ton of steel.

If, instead of the high manganese pig iron, a pig iron were used containing from 0.75 to 1 per cent manganese, the residual manganese would have been practically 0.10 at tapping time. Therefore 8.96 lb. of metallic manganese per ton steel (2240 × 0.40) would have to be added. The steel would be more highly oxidized under such conditions and a loss of 25 per cent of the manganese in the addition would have to be assumed. The manganese to be added would be 11.95 lb. metallic manganese or 14.95 lb. of ferromanganese per ton of steel. Consequently the saving would amount to 14.95 — 8.25 = 6.70 lb. of ferromanganese per ton steel.

This method of using manganiferous ores in the blast furnace does not take into consideration the other advantages which would be gained by such practice which may be summarized as follows:

Better working in the blast furnace:

The high manganese tends to eliminate some sulphur.

It keeps the hearth clean and prevents scaffolds.

The iron is more fluid and results in less scrap in runners and ladles.

Better working in the open-hearth furnace:

The high manganese tends to further eliminate sulphur.

It makes the heats work better.

Results in betterment of finished product.

Effects a saving in the quantity of ferromanganese to be added.

The above suggestions are obvious and apparently are based upon sound premises. It would be of great value if steel metallurgists would contribute in discussion of these suggestions any actual data which they may have gained by possible attempts along such lines.

National Foreign Trade Convention of 1918

Chairman James A. Farrell of the National Foreign Trade Council will shortly issue a formal call for the 1918 convention of that organization. A preliminary announcement by the secretary, O. K. Davis, India House, New York, says that the fifth national foreign trade convention will be held at the Gibson Hotel, Cincinnati, on Thursday, Friday and Saturday, Feb. 7, 8 and 9. The secretary says: "The convention will center about the absorbing subject of winning the war—what is being done in the various industrial and other lines; the part that foreign trade in its various phases plays in this great task; the wise program for the future, and the problem of the merchant marine. As in previous conventions, a considerable share of the time and attention will be given to the question and answer form of group discussion, which has proved so informative and helpful to delegates in the past."

Robert S. Alter, president of the Foreign Trade Association of the Cincinnati Chamber of Commerce, was instrumental in securing the convention for Cincinnati. Mr. Alter is vice-president and export manager of the American Tool Works Co.

PERIL OF THE CLOSED SHOP

Walter Drew Addresses Boston Branch of National Metal Trades Association

Under the auspices of the Boston Branch of the National Metal Trades Association, over 300 of the leaders of the machine tool industry of New England held an important meeting, Nov. 16, at the City Club, Boston. At the afternoon session Winslow Blanchard, Blanchard Machine Tool Co., presided. The first speaker was Walter Drew of the National Erectors' Association. His subject was "The Experience of British Industries in the War and Its Lesson for Us." Practically all of his address was devoted to a discussion of the closed shop, which, he pointed out, had been abandoned by England, as it had been compelled to adopt the open-shop program in place of the closed shop in order to meet the national exigency for increased production. He emphasized his belief that the closed-shop propaganda was the greatest menace confronting American industry to-day because it depended for its establishment and maintenance upon force and coercion. It introduces internal controversy and does not fit into our free American institutions. It brought about, he said, either a complete and automatic control of industry by unions which had no responsibility or by causing a divided control was a still more sinister, devastating and dangerous menace to the foundations of industry.

Experience of England

The speaker pointed out how English workers had laid aside all the old rules and regulations and all craft and apprentice limitations. Millions of non-union workers were introduced into the shops, and under these open-shop principles an industrial miracle had been brought about. We now had, he believed, what England had been compelled to secure, and, if we should adopt the closed-shop program, we would be accepting what England had been compelled to reject. The first check to our war program has been the thousands of strikes which have taken place since we entered the war, and the speaker laid much stress on the point that in the final analysis the captains of industry had been to blame because they had shirked their duty and had not educated the workmen to a better understanding of the problems involved in the closed-shop principle.

Clarence E. Whitney, Whitney Mfg. Co., Hartford, Conn., told in considerable detail of the Hartford plan of co-operative employment control, which has been the greatest factor in the maintenance of open-shop conditions in Hartford and Connecticut.

David S. Earll, employment manager New Process Gear Corporation, Syracuse, N. Y., gave in considerable detail the experiences of his company in the employment of women on machines. The first women were put to work in the shops on May 21 of this year. The company has about 100 women at work on Gleason bevel gear generators, Fellows gear shapers, drill presses, burring and filing machines, and on bench filing and inspecting. In all, it had hired 150 women, and of these only 12 have not made good after a fair trial. The other 38 left after a short time because of distaste for the work. Those now at work equalled or exceeded the men in production in virtually every case. All work is on a day-work basis, and the women were first started at the same pay as boys, 17½ cents an hour. It is now starting them at 20 cents an hour, paying 22½ cents at the end of one month and 25 cents at the end of three months. After that they were increased to the same rate as the men when they reached the same standard of output.

Women Exceed Men

On 3-in. Gleason generators, making differential side gears and pinions, the best record of the men was 91 gears and 260 pinions in a 9-hour day. The record of the women was 126 gears and 320 pinions. On 24-in. Fellows gear shapers the women were turning out from 20 to 30 pieces per day more than the men. On burring

and filing machines the women were turning out 250 pieces per day more than the men, the output of the women being 1150 pieces and of the men 900 pieces. On the drill press on a job of putting in a radius and reaming the bore of differential pinions, two operations on machines placed side by side, the men turned out 3200 each a day and the women 4400 each a day. On an operation of drilling out two 5/32-in. oil holes, ¼ in. deep and one ⅛-in. oil hole, ⅜ in. deep, the women turned out 246 stem gears in 9 hours, 50 pieces more than the men. The speaker said that all the women now working show strong mechanical ability, and he could not see that age or marriage made any difference.

At the dinner Robert G. Morse, president of the Boston Branch of the association, acted as toastmaster, and Lieutenant-Governor Calvin Coolidge extended the greeting of the State. Walter Gordon Merritt, counsel of the American Anti-Boycott Association, said that the nation faced the problem of whether the majesty of the law would be able to cope with the economic power of labor. He stated that labor was making progress out of the fluid state of our present conditions. Pointing out that the work of the labor adjustment board had been a failure, the speaker said that "If the President will come out boldly for a war program of the compulsory adjustment of disputes, the entire American people and the great majority of the workers will stand behind him." We have had, he said, for a long time restriction of capital, and now we need restriction of labor in order to curb its anti-social practices.

Troubles at the Arsenal

Col. Tracy C. Dickson, commandant of Watertown Arsenal, described at length the labor troubles at the arsenal and the demands that the union leaders had made upon Stanley King, who had been sent by Secretary Baker to bring about a settlement. He then described in some detail the additions under way which were vitally needed for the speeding up of guns and gun mounts. About 1500 were now employed, and the new additions would require about 2700 more men. There was great interest in his statement that it was planned to employ women on the machining of the large gun forgings. The melting capacity of the new plant would be about 230 tons a day. It was expected that about 40 tons would be used for projectiles and 150 tons for gun forgings.

Albert Greene Duncan, of the power plant conservation committee, spoke in place of James J. Storrow, fuel administrator for New England, who was detained in Washington. He stated that New England was not badly off for anthracite coal, as the shipments to Oct. 1 were 9,142,000 tons, against 8,300,000 tons for the same period last year. The bituminous situation was different and more serious. Up to Oct. 1 only 19,000,000 tons had been received, and at the prevailing rate of shipment only 25,000,000 tons could be secured by Jan. 1, which would mean that New England would go into the new year with a shortage of 7,000,000 tons.

Plant Tests for Refractory Brick

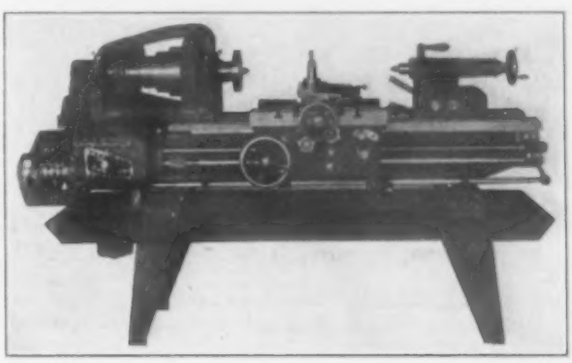
Pointing out that tests to determine the physical properties and adaptability to particular service of silica, magnesite and fire-clay bricks may be conducted by any plant at small expense, H. C. Arnold, University of Illinois, Urbana, Ill., in a paper presented before the American Foundrymen's Association at its annual meeting in Boston, September 25, described some of these and urged that they be made by consumers. He held that if operators would conduct such tests it would bring to them a more thorough knowledge of refractory materials; it would afford common grounds for discussion between the consumer and the producer, and would bring about a wiser and more profitable use of such raw materials. A thorough knowledge of material, he believes, will help the consumer of refractories to produce a better grade of metal at a less cost. He also said that silica bricks are subject to permanent expansion on heating and that allowance should be made for this when the bricks are placed in the furnace wall.

A New 15-In. Lathe for Toolrooms

A 15-in. engine lathe designed for toolroom use and also for general manufacturing work has been placed on the market by the Joseph Crawford Jr. Co., Erie, Pa. Instead of fastening the drip pan under the bed to the legs the pan is supported by the legs and extends beyond them while auxiliary legs directly above in turn support the bed.

The bed is wide and deep and correspondingly heavy with a number of reinforcing webs. There are three large V's and one flat way in front. The headstock also is of massive design. The spindle which is a piece of forged carbon steel finished by grinding has a 1¼-in. hole extending through its entire length. The front bearing, which is 2⅝ in. in diameter and 4½ in. long and the back bearing which is 2¼ in. in diameter and 3¼ in. long, are fitted with bronze bushings. A quick change gear mechanism provides for 48 different speeds and enables from 2 to 120 threads per inch to be cut. These changes are secured by manipulating the two handles underneath the headstock. A separate feed rod is provided thus enabling the lead screw to be reserved solely for screw cutting, an arrangement calculated to insure accurate work at all times.

The carriage has a bearing surface of 21 in. on the ways. The apron is secured to the carriage by an arrangement of tongues and grooves. Friction drive is provided for both the longitudinal and cross feeds, thus



Heavy Construction and the Placing of Auxiliary Legs in the Oil Pan to Support the Bed Characterize a New 15-In. Engine Lathe for Toolroom and General Manufacturing Work

enabling them to be engaged or disengaged readily, while the screw of the latter has a micrometer adjustment. The tailstock has set-over screws for use in taper work and is designed so that the compound rest can be used at right angles to the cross slide if necessary. The tailstock spindle is 1⅞ in. in diameter and has a travel of 6 in.

The taper attachment, which is not regularly supplied, is connected on the back of the carriage so as to be always within easy reach of the operator. The spiral relieving attachment enables straight and taper work and inside and outside relieving to be done on both right and left hand work with any number of flutes from 2 to 28 inclusive. With this attachment four cams, each arranged to relieve 3/32 in. in depth, are provided and the different flutes specified are taken care of by change gearing forming a part of the attachment. A universal joint and bearing block can be supplied when axial relieving is desired.

A Union of British Steel Chemists

A chemists' union is a possibility in England. The metallurgical chemists engaged in the laboratories of the iron and steel works of the Sheffield district held a meeting recently with an attendance of 120 at which it was decided to form a chemists' union. One speaker said there was a strong feeling that it was desirable either to form a union of their own or to organize as a section of a union already in existence. A committee was formed consisting of one representative from each of the 34 laboratories represented, and this committee will elect an executive body of 12 members.

Deoxidizing Basic Steel with a Saving of Manganese

A new suggestion in basic open-hearth practice, whereby a partial substitute for ferromanganese and an efficient deoxidizer of the bath is claimed to result, is offered J. I. Bronn, of Rombach, Germany, in a U. S. patent No. 1,233,970. He advocates using a molten pig iron high in phosphorus and adding it to the bath near the end of the basic Bessemer or open-hearth processes. If a calculated amount of phosphorus is used to react with the oxygen in the bath, no substantial impurification results. Under certain circumstances it may be advisable to charge an excess of phosphorus, which can easily be removed by a short refining without appreciably reoxidizing the metal. The deoxidizing effect of the addition of Thomas pig iron to the basic converter charge appears from the following comparative data relating to working with Thomas pig iron containing 0.45 per cent silicon, 1.20 per cent manganese, 1.85 per cent phosphorus and 3.5 per cent carbon:

	Manganese, Per Cent	Phosphorus, Per Cent	Carbon, Per Cent
Iron bath at end of blow.....	0.19	0.045	0.05
After addition of Thomas pig iron.	0.25	0.085	0.07

It is advisable to add the molten phosphorus-containing pig iron in the converter after skimming in order to improve the intermixing.

In connection with the open-hearth furnace the bath is refined as usual and the iron rich in phosphorus added in the molten condition when the furnace charge is nearly finished. Care is to be taken that the slag layer on the iron bath is not very high in phosphorus and that it is in as thin liquid condition as possible. The following comparative data show the effect of the addition of Thomas pig iron:

	Manganese, Per Cent	Phosphorus, Per Cent	Carbon, Per Cent
The furnace charge (33 tons) after refining contained	0.26	0.030	0.10
The Thomas pig-iron addition (1500 kg.) contained	1.75	2.78	3.5
The deoxidized bath contained....	0.43	0.062	0.15

The bath shows an increase in manganese over the amount of manganese contained in the pig-iron addition as follows:

The bath contained.....330 x 0.26 = 85.8 kg.
And the addition..... 15 x 1.75 = 26.1 kg.

Total manganese .....111.9 kg.

The bath contained, as above stated, 0.43 per cent manganese or 148 kg., so that an increase of 36.1 kg. manganese has taken place. The phosphorus on the contrary shows a considerable decrease, as follows:

The charge contained.....330 x 0.03 = 9.9 kg.
The addition ..... 15 x 2.78 = 41.8 kg.

Total phosphorus ..... 51.7 kg.

The bath contained $345 \times 0.062 = 21.3$ kg. phosphorus, so that a decrease in phosphorus of 30.4 kg. has taken place which have been used for deoxidizing purposes.

These data relate to the pig and ore process. Similar results are obtained in connection with the pig and scrap process. If compared with the usual deoxidation process with ferromanganese alone the deoxidation with the pig iron (Thomas pig iron) rich in phosphorus results in saving 2 kg. metallic manganese or 4 kg. ferromanganese with 50 per cent of manganese for each ton of steel.

Proposed Increase of Rates

At Washington, on Friday, Nov. 23, the Interstate Commerce Commission authorized railroads to file tariffs applying increased rates on iron and steel from Cleveland, Zanesville, and the Mahoning and Shenango valleys, to points between Buffalo and Pittsburgh and the Mississippi River. The increase would be accomplished by applying class rates instead of commodity rates.

A new foundry will be established in Martinette, Mich., by the Northern Foundry Co. It will occupy the Iron Works plant on Main Street.

British Steel Exports and Imports for the Third Quarter

British steel exports for the third quarter of 1917 have been larger than for any quarter this year. The total, excluding iron ore and including scrap, was 660,644 gross tons, comparing with 636,397 tons for the first quarter and 600,591 tons for the second quarter. The exports in the last quarter, however, have been constantly decreasing from 268,190 tons in July, the highest of the year, to 177,393 tons in September, the lowest of the year.

Pig-iron exports have been fairly steady. For July they were 67,382 tons, for August 56,996 tons and for September 59,869 tons. Ferroalloy exports, mostly ferromanganese, have been normal under present conditions. For July they were 6709 tons, for August 8387 tons and for September 8197 tons. Total pig-iron and ferroalloy exports for the three months were 207,540 tons comparing with 200,865 tons for the first quarter and 212,732 tons for the second.

Rail exports in the third quarter were 12,139 tons, nearly double the 6808 tons of the second quarter, and comparing with 12,938 tons for the first quarter. The extent to which they are below normal is indicated by the exports for the first nine months in 1913 of 379,105 tons and of 365,939 tons to Oct. 1, 1914.

Steel-bar exports in the third quarter were 157,314 tons and exceed those of the other two quarters this year when they were 103,592 tons and 73,027 tons respectively. The July exports of 68,103 tons was the largest month this year with 52,594 tons in August and 36,617 tons in September. The total to Oct. 1, 1917, of 333,933 tons compares with 498,073 tons to Oct. 1, 1916.

Steel imports, excluding iron ore and including scrap, were 157,665 tons exceeding the two previous quarters when they were 96,397 tons and 105,779 tons respectively. The August imports of 73,298 tons were the largest of any month this year. This was due to larger receipts of blooms, billets and slabs. Total imports to Oct. 1, 1917, of 359,841 tons compare with 610,803 tons to Oct. 1, 1916. To Oct. 1, 1913, they were 1,708,174 tons, indicating the extent of the decline.

Imports of steel blooms, billets and slabs in the third quarter were 34,633 tons comparing with 11,927 tons in the first quarter and 8687 tons in the second quarter. The August imports were 24,615 tons, the largest of any month this year. The total to Oct. 1, 1917, has been 55,247 tons as compared with 117,800 tons to Oct. 1, 1916. The extent to which these imports have declined is shown by the fact that to Oct. 1, 1915, they were 359,867 tons.

British and American Data on Crude Steel

A great discrepancy exists between the British official figures of imports of steel ingots, billets and blooms and those given in the United States Government's figures for exports to Great Britain. The comparison follows in gross tons:

	British Report of Imports	U. S. Exports to Great Britain
To Aug. 1, 1917.....	31,890	361,981
To Sept. 1, 1917.....	57,066	486,054

The probable explanation of the very wide variation in the figures as shown is that the published reports of British imports do not include those of the British Government, which in the case of billets and blooms have been very heavy.

The Erie Forge & Steel Co., Erie, Pa., will expend between $5,000,000 and $10,000,000 on the construction and equipment of new buildings for forging guns. Three buildings are now being planned, measurements of which are 64 x 276 ft., 40 x 64 ft. and 192 x 300 ft. The engineers are Day & Zimmerman, 611 Chestnut Street, Philadelphia. K. F. Devine is president of the Erie Forge & Steel Co.

The Southern Ferroalloys Co., Chattanooga, Tenn., has appointed the Canada Carbide Sales Co., 30 Church Street, New York, as exclusive sales agent for the 50 per cent ferrosilicon produced electrolytically at Chattanooga.

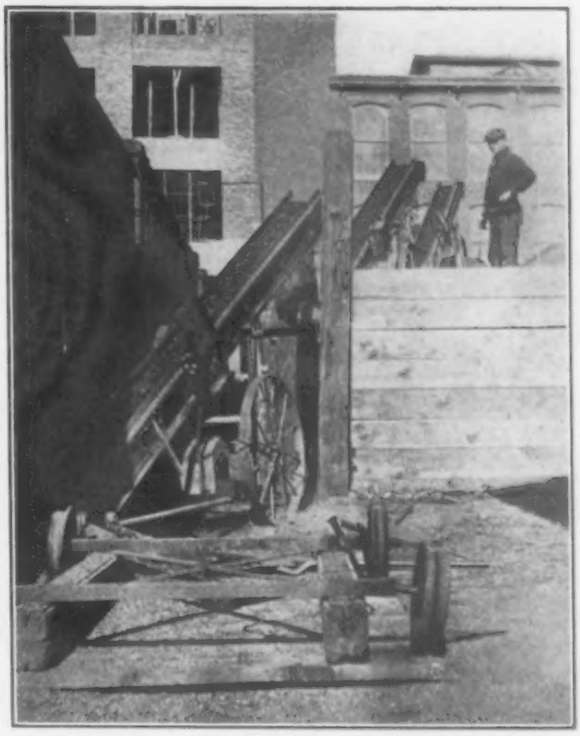
Motor-Driven Portable Scoop Conveyor

The Portable Machinery Co., Inc., Passaic, N. J., is building a new type of portable belt conveyor. It may be driven by a self-contained electric motor or internal combustion engine and is designed for handling loose material or boxed products.

When handling the loose material the conveyor is supplied through a scoop at the lower end which can be pushed into or completely buried by the material to be moved. A portable machine handled by one man is thus available for loading and unloading, storing or reclaiming loose materials, such as coal, coke, ashes, crushed stone, sand, gravel, etc. In connection with the handling of coal from hopper or drop bottom cars, the lower end of the conveyor can be run in under the car and the material elevated from the track level a distance of 6 to 9 ft. to a storage pile. Or it can be elevated in one or more successive stages as indicated in the illustrations, until the pile is filled up to the desired height. In addition to handling loose material at the rate of 1 ton in 1½ min., the conveyor can also be employed for sacks, packages, boxes and manufactured products.

The conveyor is built of steel and is mounted on two wheels attached to the upright supports of the conveyor. At the lower end of this upright are two horizontal pipe section members which join the side supports of the conveyor near the lower end, the arrangement being roughly that of right-angled triangle with an extended hypothenuse. The driving motor is mounted on the horizontal support and transmits power through a chain and sprocket connection to a shaft located directly above it and extending underneath the conveyor from one side to the other. From a sprocket on the other end of this shaft power is transmitted to another sprocket at the upper end of the conveyor which does the actual driving. When it is desired to move the conveyor from place to place, this is readily accomplished by inserting two pieces of pipe in the ends of the horizontal member, when a man may move it somewhat as he would a wheelbarrow.

The Lower End of a Portable Motor-Driven Belt Conveying Mechanism Forms a Scoop That Can Be Forced into the Material Being Handled



Coal Can Be Dumped from a Railroad Car and Elevated by Successive Steps to the Storage Pile

Methods for Producing Spur Gears

The rotary or disk cutting process and the shaper method for producing spur gears were discussed in papers presented at the recent meeting of the American Gear Manufacturers' Association. In one by Henry E. Eberhardt, secretary Newark Gear Cutting Machine Co., Newark, N. J., the rotary or disk cutting process was gone into at some length. The progress made in the past half century in the development of cut gears was mentioned and the part played by the electric motor in the development of cut gears shown. At the present time Mr. Eberhardt stated that this method of production had a range from as fine as 64 diametral pitch up to as coarse as 6-in. circular pitch. Either very accurate work can be produced with care or the average demand for a fairly accurate gear at a low price can be met by this method. When changes in the form of tooth became necessary from time to time in the advance of the art, the cutter readily lent itself to such changes as the form that would be produced could be seen in advance.

In the other paper Franklin Schneider, manager the Van Dorn & Dutton Co., Cleveland, stated that the gear shaping machine possessed great flexibility for cutting from 4 to 2 pitch in steel and up to 48 in. in diameter. In addition to producing ordinary spur gears of the external type rapidly and accurately, internal, shoulder and cluster gears can be produced without the use of any attachment or device, the same type of cutter being employed as for the external gear and no changes being necessary in the machine.

A training school for women has been established by the Packard Motor Car Co., Detroit. They are expected to do work in the carriage division chiefly, in upholstering and trimming jobs. The safety-first department has prescribed costumes. The women may wear either loose overalls or jumpers or bungalow aprons made of khaki or overall material and must wear caps to protect the hair. Most of the young women in the factory, it is stated, prefer not to wear overalls.

War Excess Profits Law Attacked

Charged that Discrimination Imperils Existence of Many Concerns—Advisers Will Report—Congress Meets Next Monday

WASHINGTON, Nov. 27.—The Board of Excess Profits Advisers, appointed by Secretary McAdoo to assist the Commissioner of Internal Revenue in administering the war revenue act of Oct. 3, 1917, will close its conferences to-morrow and will make a formal report to the Commissioner on Dec. 1. The work of the board has been expedited by devoting the mornings to executive conferences and confining to afternoon sessions the hearings granted to parties who desired to submit criticisms of the law or recommendations for its amendment. Coincidently with the work of the board, the offices of the Commissioner and of the Secretary of the Treasury are framing suggestions for further revenue legislation to be enacted at the coming session which convenes on Monday next, designed to produce approximately $1,700,000,000 additional, thus making the net income of the nation from all forms of taxation $5,700,000,000 per annum. Upon this basis and putting the actual expenditures for all purposes, exclusive of loans to the Allies, at $15,000,000,000 per annum, about 35 per cent of the current cost of maintaining the Government and carrying on the war will be paid by taxation and 65 per cent by the issue of bonds, short-time Treasury certificates and five-year war savings stamps.

Amendments Proposed

The business men of the country, especially of the big manufacturing concerns, are making a hard drive to bring about the comprehensive amendment of the war excess profits tax and have laid before the Internal Revenue Bureau a mass of facts and figures that it is believed will result in the substantial revision of this extraordinary piece of legislation. The new law is being attacked, not on the ground that it is an unreasonable taxing measure with respect to the share of so-called war profits which it will require to be turned into the Treasury, but solely on the score that it is inequitable and discriminatory to the extent to absolutely imperil the existence of many large establishments which are fully prepared to contribute their entire share of taxation but cannot live and make any return to their stockholders under the operation of the war excess profits provision.

It is a conservative statement that since the war excess profits advisers began their work in the Internal Revenue Bureau, several thousand communications have been received pointing out glaring inconsistencies and inequalities in the operation of the new law, many of them supported by carefully worked-out examples of the effect of the law upon specified concerns. One of the most graphic illustrations brought to the attention of the board has been prepared jointly by a corporation lawyer of high standing assisted by an actuary of long experience. The memorandum submitted to the board cites four hypothetical concerns, each with the same invested capital and the same profits, but which, under the terms of the law, will pay taxes ranging from a minimum of $52,224 up to $123,952. The four cases are designated as follows:

1. John Smith — Invested capital, $500,000; profits, $250,000.

2. Jones, Brown & Gray (copartnership)—Capital, $500,000; profits, $250,000.

3. Johnson, White & Little (incorporated since March 3, 1917)—Preferred stock, $500,000 (representing tangible assets and $100,000 common stock, issued for good will); net tangible assets, $500,000; profits, $250,000; annual salaries of $25,000 paid to each of the three executive officers.

4. Black, Thompson & Wilson, incorporated (incorporated prior to March 3, 1917)—Preferred stock, $500,000 (representing tangible assets and $100,000 common stock issued for good will); net tangible assets, $500,000; profits, $250,000; annual salaries of $25,000 paid to each of the three executive officers.

The individual concern operated by John Smith would pay the maximum taxes, which are accurately figured out in detail as follows:

1. John Smith—From 1917 net income subtract 15 per cent of 1917 invested capital, which 15 per cent would be $75,000; from which amount deduct 9 per cent of 1917 invested capital and $6,000, to wit, $51,000, leaving $24,000, which, taxed at 20 per cent, equals $4,800. From this balance of 1917 net income subtract 5 per cent of 1917 invested capital, $25,000, which, taxed at 25 per cent, equals $6,250. From this balance of 1917 net income subtract 5 per cent of 1917 invested capital, $25,000, which, taxed at 35 per cent, equals $8,750. From this balance of 1917 net income subtract 8 per cent of 1917 invested capital, $40,000, which, taxed at 45 per cent, equals $18,000. Leaving a balance of net income, $85,000, which, taxed at 60 per cent, equals $51,000. Total war excess profits, $88,800. In addition to the foregoing John Smith, as an individual, would pay his personal income tax upon income for the year of $250,000, less excess profits tax of $88,800; viz., $161,200, tax being $35,152. Total tax of John Smith, $123,952.

The next largest contribution to this tax would come from the copartnership, Jones, Brown & Gray, which is figured as follows:

2. Jones, Brown & Gray—This partnership would pay the same excess profits tax on an income of $250,000 as in the case of the above-named individual, namely, $88,800. Each partner would also pay his individual income tax on his one-third share of the undivided profits of the firm for the year, less excess profits tax, namely, $161,200, being a tax on $53,733 to each; in the case of each partner being a tax of approximately $5,627.96 in each instance, $16,883.88, a total of $105,683.88.

Blow Misdirected

In framing the war excess profits tax, the conference committee, which is solely responsible for this feature of the war revenue bill, the original work of the Ways and Means and Finance committees having been abandoned, sought to strike a heavy blow at concerns doing business in corporate form but utterly failed of their object. The calculation as applied to a new corporation—"new corporations" being a category specially designed to include munition manufacturers—produces the following result:

3. Johnson, White & Little, Inc.—In this case, inasmuch as the three executive officers constitute a close corporation, and in reality a partnership in corporate form, and each draws a salary of $25,000, the net income of the corporation would be reduced to $175,000, which, computed in the manner above described, the excess profits tax would be $45,600; in addition to the above, the corporation would pay war income and federal income taxes of 6 per cent, namely, $7,764; assuming that the surplus income is used in the business and not paid out as dividends, the individual stockholders would each pay an excess profits tax of 8 per cent on the salaries drawn by each in excess of a statutory exemption of $6,000, namely, 8 per cent of $19,000—$1,520 each, or for all three persons, $4,560. In addition thereto, each of them would pay an individual income tax based on the salaries so received, after deducting the amount of excess profits tax paid, namely, a tax on $24,480 for each, the amount of which tax would be approximately $1,500 for each, or a total of $4,500; total tax paid by corporation and stockholders, $62,424.

In striking contrast with the taxes levied upon individuals and copartnerships and even as compared with a new corporation is the small impost incurred by corporations in existence before Congress began the framing of the war revenue act, as will be seen from the following:

4. Black, Thompson & Wilson, Inc.—In the case of this corporation, which was incorporated prior to March 3, 1917, and therefore, under the statute, entitled to include as part of its invested capital the sum representing the value of its good will, namely, $100,000, the tax would be reduced because of computation on the basis of an enlarged invested capital,

namely, $600,000, instead of $500,000. This enlarged invested capital, based purely on the accidental fact of date of incorporation, would reduce the amount of the excess profits tax, so that the same in the case of this corporation would be only $36,400, as compared with $45,600 in the case of the corporation covered by the preceding illustration. And the total taxes payable by the corporation and stockholders in this instance would be reduced accordingly.

The Next Session of Congress

The opening of Congress will be signalized by the introduction of numerous bills designed to amend the war excess profits tax feature of the revenue act, but the Ways and Means Committee, which has original jurisdiction of the subject, will probably take no action until the Secretary of the Treasury has had time to pass upon recommendations of the board of advisers. It is improbable that the Administration's measure will be approved by the committee before the holiday recess, but there is little doubt that if it is confined to amendments of this particular feature of the law it can be put through both houses before March 1, next. Should these amendments be consolidated with the general revenue provisions now under consideration, some very vigorous work will be necessary to pass the bill by that date.

Owing to the fact that the departments have not been able to spend as rapidly as was anticipated the enormous appropriations granted at the last session, the Treasury Department will be able to cut down its estimate of necessary additional revenue from $2,500,000,000 to $1,700,000,000. The war revenue act is estimated to produce $2,600,000,000 and prior revenue legislation $1,400,000,000, so that the Federal income will total $5,700,000,000. The money to be raised at the coming session, according to members of the Ways and Means Committee, will be derived from four chief sources, namely, increased income taxes, larger war excess profits taxes, consumption taxes on certain commodities including sugar, tea, coffee, and cocoa, and an increase in the existing customs tariffs coupled with the transfer of a large part of the free list to the dutiable schedules.

Proposed Tariff Changes

The proposed tariff changes will be stubbornly fought in both House and Senate and in view of the rejection of a similar proposition at the last session its consideration by the House will probably be less perfunctory than before. The Senate having gone on record against this unscientific method of revising the tariff and the tariff commission having expressed its disapproval, members of the House will be disposed to display much more independence than during the last session. The imposition of duties upon the free list will be attacked with great vigor on the special ground that current importations upon which no duties are now levied are chiefly of food products and materials of value for war purposes. The imposition of tariff taxes on such articles as iron ore, ferromanganese, manganese, tin, rubber, hides and leather, etc., cannot be defended upon any theory except that the revenue thus derived is absolutely essential to the conduct of the war and cannot possibly be obtained from any other source. No such condition exists and it is believed that whatever action may be taken by the House, the Senate will adhere to the position assumed at the last session when the proposed tariff increases were rejected on the ground that they would be most demoralizing to the industries of the entire country and especially to those depended upon for the prosecution of the war. W. L. C.

The Defiance Machine Works, Defiance, Ohio, will place its plant on an eight hour basis Jan. 1, but the present rates and the ten hour day, 55 hour per week schedule, will be maintained. However, all overtime beyond eight hours will be paid at the rate of time and a half and each employee who works the full 55 hours each week will be paid a 5 per cent bonus.

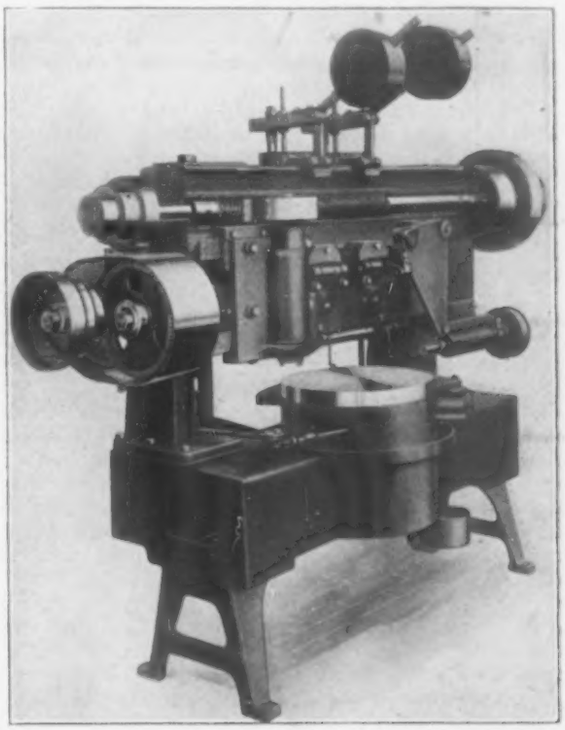
Between 1500 and 1800 women have taken the place of men in the last few weeks in Cleveland metal-working establishments. They are employed largely on drill presses, punching machines and light bench work.

A Special Milling and Drilling Machine

To enable the knuckles of automobile steering gear to be milled and drilled at a single setting, the Moline Machinery Co., Moline, Ill., has built a special machine. It is designed for continuous operation, a revolving table being provided. Another advantage claimed for the machine is that the surfaces that are milled and the holes which are drilled in the knuckles are in absolute alignment, since all of the operations are performed at a single setting of the work.

The machine is equipped with four spindles, on one of which a milling cutter is mounted, while the remaining three are employed for drilling. A direct belt drive from the main shaft is employed for one of the drilling spindles, while the remaining two and the milling spindle are driven by spiral gears. Cam feed is provided for all of the spindles, the throw of the cams being varied to suit the work. Adjustments to care for the wear of tools are provided for all the spindles, and that employed for milling has a large taper bearing on the lower end to compensate for wear.

A revolving work table is 22 in. in diameter, and after the tools are withdrawn upon the completion of an operation it is indexed automatically through an arc of 60 deg. to bring the work in position for the next operation. While one piece is being milled and



Continuous Milling and Drilling of Automobile Steering Knuckles Is Obtained in a Recent Four-Spindle Machine Equipped with a Revolving Table

drilled the operator is engaged in removing the previous piece and replacing it with another. In this way continuous operation is secured.

The machine occupies a floor space of 3 x 8 ft. and has an over-all height of 6 ft. The distance from the floor to the table is 36 in., and the shipping weight is approximately 5900 lb. The power consumption is 5½ hp. The machine can be used to handle a wider range of the work than that for which it was especially designed, and the travel of the spindles can be varied within certain limits according to the requirements of the work which has to be accommodated.

Shellmakers and munition manufacturers in British Columbia have been informed that no contracts for shells for the United States are to be awarded in British Columbia. It is stated that contracts for huge numbers of shells will be let in Canada, but work will be confined to plants in the East, due to the extra cost of freight, should they be manufactured on the Pacific coast.

Whitaker-Glessner Blast Furnace

The new blast furnace at the Portsmouth, Ohio, works of the Whitaker-Glessner Co., that was blown in on Aug. 27, has three hot-blast stoves and turbo-blowers for furnishing the blast. It has a daily capacity of 550 tons and is 92 ft. high with a 17-ft. hearth, 22-ft. mantle, 17-ft. stock line and a bosh angle of 78½ deg. The hot-blast stoves are of the two-pass side combustion chamber type with 4½-in. checkers. These stoves measure 24 ft. in diameter and are 110 ft. high. Two electrically driven turbo-blower units with a capacity of 44,500 cu. ft. at 22-lb. pressure furnish the hot air for the blast. Washed gas will be used both in the hot-blast stoves and under the boilers.

The ore yard has a capacity of 400,000 tons of ore. Ore is recovered from the yard by a bridge carrying a 7½-ton bucket. The stockhouse equipment is of the Hooven and Mason design and contains one 60-ton transfer car and two single-compartment scale cars.

The iron is taken from the furnaces in 75-ton hot metal ladles to the pig machine house. From there it is transferred into 30-ton charging cars to be used in the open-hearth furnaces. Iron desired for stocking is poured over a two-strand Uehling pig casting machine.

The power house equipment consists of six 825-hp. vertical water tube boilers, two 3000-kw. turbo-generators, two 750-kw. motor-generator sets, two hydraulic pumps for operating the bell, etc., two turbine-driven boiler feed pumps, two turbine-driven 15,000-gal. service pumps and two motor-driven 3,250,000-gal. gas washer pumps.

The water supply is obtained from the Ohio River through a pump house containing three 20,000-gal. motor-driven pumps which deliver to a 40-ft. standpipe. This standpipe furnishes water directly to the condensers and hot well. The service pumps deliver water from the hot well to a standpipe 115 ft. high. All the cooling water used at the furnace is supplied by this standpipe, as well as the water for general use.

Germany and the French Lorraine Iron Ore Deposits

A prominent German steel maker stated at a recent meeting of the Haspe Iron & Steel Works Co. that Germany is not in a position to go without the iron ore supply from the occupied district of French Lorraine. Germany only has at her disposal, he said, an ore reserve of something over 3000 million tons and is therefore substantially dependent upon iron ore imports. In addition to large quantities obtained elsewhere, Germany has principally directed her attention to French Lorraine and only the annually increasing quantities obtained there have made it possible for France to reach an output which nobody in France had ever thought of before. German enterprise has also taken a share in the development of these iron ore deposits and France, the speaker said, is not dependent upon them, being the richest iron-mine-owning country in Europe, if her colonies are included. According to reliable estimates, France has at her disposal reserves of 10,000 million tons of iron ore, the colonies alone representing 400 million tons of this total. The Briey and Longwy basins contain 3000 million tons, so that, leaving out this quantity, France would still own iron ore reserves of about 7000 million tons, of which 5000 million tons in Normandy are of a quality greatly surpassing in iron content the ores of Germany and French Lorraine.

The Youngstown Wage Table Co., Youngstown, with a capital of $10,000, has been incorporated. The company has devised a new method of computing wages, which has been worked out satisfactorily at the plants of the Youngstown Sheet & Tube Co., where H. W. Kerr, one of the incorporators, is paymaster.

A new booklet, Electric Furnace Bulletin No. 40, October, 1917, has been issued by the Industrial Electric Furnace Co., Chicago. It is descriptive of the Snyder furnace and is well illustrated.

Pipe Corrosion in Buildings

To determine the life of water pipe in buildings under varying conditions of service, Thomas F. Payne, a sanitary engineer of Pittsburgh, was commissioned by the A. W. Byers Co., maker of iron pipe, Pittsburgh, to make a house-to-house canvass. It appeared that apartment buildings offered the best field for investigation, and 125 such buildings, all in Pittsburgh, were studied. A tabular statement compiled by the company gives the year of erection of each building and the life of both hot and cold water lines of brass, steel and wrought iron where such had to be removed.

The investigation showed the corrosion to be most severe in hot water mains (exposed basement piping) and the recommendation is that pipe one size larger than that used in regular practice be used. The point is that the larger size, having a greater thickness and larger bore, would not so easily rust through or become stopped up with rust. The hot water risers, which are usually concealed, proved to have a much longer life than the basement mains. It is therefore a question whether the practice of specifying brass pipe for risers, and iron or steel for mains, might not better be reversed.

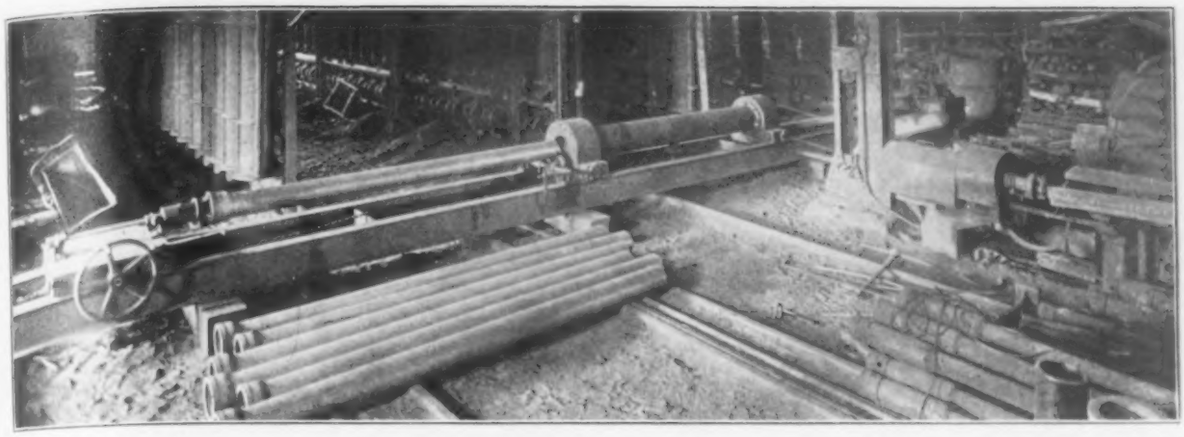
Brass pipe in this investigation did not show up as well as might be expected. Genuine wrought-iron pipe, in 65 buildings, ranging in age from 8 to 20 years, did not show a single failure when used for cold water supply, and in only one or two of these buildings did the iron hot water risers require repairs in the same period of time. Lead pipe, for hot water risers, seemed to have an average life of 18 years, one complete failure being recorded after 14 years' service. It appeared from the investigation that the pipe lasted a little longer where an automatic water heater was used. This is regarded as due to the possibility that a lower temperature of the water is maintained than with a heater without thermostatic control, corrosion increasing with temperature and reaching its maximum between 140 and 170 deg. Fahr. Temperatures from 115 to 130 deg. are recommended wherever they will serve the purpose.

Will Build Sheet Zinc Rolling Mill

The American Zinc Products Co., recently organized at Youngstown, Ohio, with an authorized capitalization of $1,000,000 to build and operate a sheet-zinc rolling-mill plant at Greencastle, Ind., has effected a permanent organization, as follows: D. W. Kerr, president and treasurer; F. W. Stillwagon, vice-president; H. S. Buck, vice-president and general manager; R. A. Leitch, secretary; Edward Lagenbach, Wade A. Taylor, D. W. Kerr and F. W. Stillwagon, executive committee. President Kerr states that rapid progress is being made on the 10-mill rolling-mill plant at Greencastle, and that his company will engage in production of various articles from sheet zinc, which heretofore have been made from copper and tin plate. A stamping department for this work is being installed. Oil and food containers, formerly made from tin plate, will be made from zinc, in keeping with the recommendation of the Department of the Interior. Zinc sheets also are displacing copper in many cases, owing to the high cost of the latter. Zinc is also used in large quantities for ammunition containers. Operations will start early in the spring.

The general advisory committee on safety of the State Industrial Commission of Ohio, representing the Ohio Manufacturers' Association and the Ohio Federation of Labor, has appointed committees on fire prevention and electrical safety. The former committee will make a study of fire hazards in the workshops and factories of the state and prepare a state fire prevention code. The committee on electrical standards will review the standards prepared by the United States Bureau of Standards, with a view of having them adopted in Ohio.

Recently the W. H. Mullins Co., Salem, Ohio, laid off about 250 men, due to cancellation of orders for automobile parts by builders of pleasure cars.



The Machine in a Canadian Plant Which Produces 6-In. Cast-Iron Pipe by a Centrifugal Process, and Some of the Pipe. About 25 pipes are made each hour

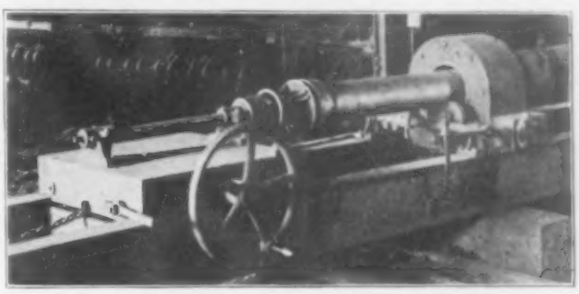
CENTRIFUGAL CAST-IRON PIPE

A Plant in Canada Making 6-Inch Pipe by the New Process

IN THE IRON AGE of Sept. 7, 1916, there was described a machine for making cast-iron pipe by a centrifugal process. It was stated at the time that pipes of all sizes were being produced on a commercial scale in Brazil in two localities by machines of this character and that a small machine for making 4-in. pipe had been made in this country to demonstrate the process, which is the invention of a Brazilian.

Since that time the developments have been fairly rapid and successful. A company was formed early this year in Canada to exploit this patented process in that country. It is known as the National Iron Works, Ltd., Toronto. A machine has been constructed and installed in a plant in that city, built on very much the same lines as the 4-in. one referred to, only it is considerably larger. Since Sept. 14, 1917, this machine has been operating and turning out successfully 6-in. cast-iron pipe each 10 ft. long. The view at the head of this article shows the new machine as it appears in the Toronto plant. Some of the pipe made in it are also shown. Its capacity is easily 20 to 25 such pipe each hour and this has been its record since it was started. The company's president is Cawthra Murdock and its vice-president and general manager, Gordon F. Perry, and it owns the exclusive right to use the process in Canada.

Briefly, the process consists in introducing hot iron from a cupola or blast furnace in prescribed quantities, corresponding to the weight of the pipe, into a trough. This is immediately inverted in the rapidly revolving water-cooled steel mold inside the machine where, by centrifugal force, the metal is deposited uniformly, forming a pipe of the usual form, only thinner and of uniform thickness. The other two illustrations show how the metal is introduced from the ladle into the machine and how the pipe appears as it is coming out. The pipe is almost immediately withdrawn as soon as congealed.



How the Finished Pipe Appears Immediately After Casting, as It Comes from the Machine

How the Hot Metal Is Introduced Into the Trough from the Ladle

An announcement as to interesting developments in this country is expected in the near future.

Investigating Virginia Manganese Ore

An outcome of the work of the war minerals committee, composed of representatives of the American Institute of Mining Engineers, the U. S. Geological Survey, the U. S. Bureau of Mines and the State geological surveys, is an examination of Virginia manganese properties to be made by four prominent mining engineers—Philip N. Moore, F. Lynwood Garrison, Prof. Robert H. Richards and Allen H. Rogers. These men are now in Virginia and will follow a program arranged by Dr. Thomas L. Watson, the State geologist, in co-operation with the manganese miners of the State. Mining and milling methods that will improve production will be considered as will the problem offered by the inadequate water supply at most of the mines during certain seasons of the year.

McLain System, Inc., 906 Goldsmith Building, Milwaukee, Wis., has changed its name to the McLain-Carter Furnace Co. Oil fired open-hearth and metal melting furnaces will be the company's specialties.

Dangers of Blast-Furnace Breakouts

Their Causes and Methods of Prevention Discussed in Bulletin to Be Issued by Bureau of Mines—Some Kinds of Accidents Have Almost Entirely Disappeared

WASHINGTON, Nov. 27.—The results of a study of the dangers of blast-furnace breakouts, the technical aspect of their occurrence and the methods in use for preventing them are incorporated in a bulletin prepared by F. H. Wilcox and about to be issued by the Bureau of Mines.

A "breakout" is the term employed to denote the conditions and results of the escape of gas and coke, or slag, or iron, from the bosh, tuyere breast, or hearth of a blast furnace. Breakouts may occur at any point below the fusion zone in the furnace, but the most frequent breakouts are of molten iron at a level below the surface of iron lying in the hearth, and are either through the hearth walls and jacket or into the hearth bottom and out under the hearth jacket.

If this runaway fluid comes in contact with water or wet material an explosion occurs which may wreck the furnace or casthouse equipment. An explosion in one plant caused damage amounting to $80,000. Several furnaces have been put out of blast by such accidents, and in numerous instances men have been injured or killed by flames, flying metal, brickbats, and castings when these explosions take place. The term "explosion," as applied in this sense, should not be confused with explosions of gas.

Hazards from Breakouts

At most plants in this country the danger of hearth breakouts has been reduced remarkably during the past 10 years, and at these plants, so the writer believes, is becoming almost negligible as a factor in the accident risk. The hearth has received much attention, and heavier, stronger, and more expensive construction has been developed until the two types of hearth now standard rarely permit explosive breakouts.

Slag breakouts occur from the top of the hearth jacket and about the cinder notch up to the level of the tuyeres. They are seldom dangerous to life or limb, but may cause some damage to the brick lining and are a considerable nuisance and annoyance, because of the resulting delay for repairs and the time necessary to clean up the "mess" they cause.

Blast, gas, and coke breakouts, usually known as bosh breakouts, are almost a thing of the past; the last one in this country was in the spring of 1914. Their elimination may be attributed quite as much to improvements in practice, smoother work on increasingly inferior ores, and less violent "slips," as to strengthening of boshes. Although improvement in boshes is generally keeping pace with other furnace construction in augmenting security, nevertheless at many plants the bosh is not so strong, proportionately, as other parts of the furnace. With the present control over furnace operation, the bosh does not fail except at infrequent intervals. However, if plants with somewhat weak boshes should be subjected to periods of heavy driving for large production, with consequent severe slips, such as have happened in the past, it may be that some boshes, although adequate for normal pressures and slips, would give way. One such accident has happened.

In the trade journals from 1885 up to 1907, frequent mention was made of bosh breakouts; since 1907, they have steadily decreased. Rarely are any details given in these notices, and they are mentioned here only because of the significance of their decreasing number.

Tuyere-Breast Breakouts

The tuyere breast is comprised in that part of the hearth which extends from the bottom of the bosh to the top of the hearth jacket. The brickwork at this point is 18 in. to 2 ft. 9 in. thick and is built of standard 9-in. brick inclosing the tuyere-cooler arches and cooling-plate openings. The tuyere breast in a modern 500-ton furnace is about 5 ft. 6 in. high and the outside surface, with a 2-ft. 6-in. wall inclosing a 17-ft. hearth, 22 ft. in outside diameter, is about 390 sq. ft., which is diminished by 12 cooler openings 30 in. in diameter and usually by 36 cooler-plate openings 5 in. by 24 in. in size, making a total exposed surface of approximately 330 sq. ft.

The most energetic combustion of coke and the strongest inthrust of the blast are directly within this part of the furnace. The temperature at the nose of the tuyere may reach 3300°F., and may be as high for a considerable space adjacent, because the combustion of 750 pounds of coke cannot be instantaneous at the 12 or 16 small spaces in front of and above the tuyeres. As the nose of the tuyere is but 6 to 15 in. beyond the face of the brickwork, the combustion temperature must reach nearly maximum intensity at the face of the brick. This temperature is sufficient to melt any but the best hearth brick and to soften the best brick so that it becomes plastic or will flow under compression.

The danger of breakouts between the tuyere coolers, when the brickwork gets thin from melting, slagging, and mechanical abrasion from the back thrust of the gas, is usually provided against by the insertion of bronze cooling plates. These plates are usually built solidly into the brickwork from the outside face to within 9 in. to 4½ in. of the inside face. Occasionally only one plate, placed vertically, is used; more often, two plates are laid horizontally one above the other, about 15 to 18 in. apart, center to center; infrequently, three plates, 12½ in. apart, center to center, are used. The plates are roughly of the same type as those used in the bosh, being tapered horizontally and vertically. Although the wearing action is most severe, such plates have proved entirely satisfactory. A few managers go a step further and provide water-cooled plate boxes in which to place the plates, but many furnace men do not consider it necessary or advantageous to do so, as a water-cooled plate cools the brickwork just as effectually and also prevents thinning and breakouts of the tuyere-breast wall.

Safe methods of practice are of little avail in preventing tuyere-breast or bosh breakouts, if by faulty design or construction, weakly built, insufficiently reinforced, or improperly cooled segments of brickwork have been incorporated in this part of the furnace. Modifying methods of practice are of little benefit because of the suddenness with which such accidents occur. Possibly 95 parts of prevention lie in construction and five parts in experience, resourcefulness, and arrangement of the cast house for accessibility of signals and possibilities of escape.

The bosh plates should be flushed out regularly to prevent loss of cooling efficiency from sediment depositing in them. Hot spots on the bosh jacket should be remedied by putting on additional sprays. The use of longer tuyeres is effective in correcting any tendency to local heating on the side of a bosh jacket. A longer tuyere also diminishes the tendency to cutting about the bosh plates, between the tuyere arches, on the tuyere breast walls, or near the cinder cooler. At best, longer tuyeres, tuyeres with a smaller nose, or plugged tuyeres are but temporary expedients, and if they must be persistently used to prevent fast or abnormal working on the walls and severe erosion, their use is likely to produce off-grade iron and dangerous conditions of scaffolding, hanging and slipping.

Hearth Breakouts

During the past few years serious breakouts occur more frequently at the hearth than at the bosh and

tuyere breast. In fact, this has always been so, but with small amounts of iron in the hearth the breakouts were not necessarily serious, especially as the blast pressure was not high. With increasing tonnage and fast driving they assumed serious proportions, sometimes wrecking the furnace, occasionally costing lives, and almost always causing bad messes, delays and inconveniences.

The destructive agencies within the hearth walls are as follows: (1) Erosion of the hearth walls by the blast, especially over the tapping holes; (2) disintegration of the brickwork by the chemical action of liquid slag and iron; (3) mechanical action of fluid in penetrating the joints of the brickwork.

It is evident that the bringing down and accumulation of molten iron and slag in a zone of intensive combustion, pressure, and heat, require exceptional construction. Improvement in strength, insulation and cooling has developed this part of furnace design to a point where plants at which one or more breakouts always occurred during a blast, have reduced the danger of breakouts to an almost negligible factor.

One point should be kept in mind in regard to hearth breakouts, and that is: regardless of the thickness of hearth walls or the cooling intensity on the exterior, all furnaces become worn away on the inside, so that the wall becomes relatively thin, and retains its form only by virtue of the cooling and reinforcement of a metal jacket. This condition is found in furnaces blown out even after a short run. The thinning of hearth walls is partly attributed to the erosive action of currents of gas caused from combustion and the blast, when the cinder and iron is low after a cast. Erosion is effected as in the bosh and tuyere-breast walls, and is especially active when at casting or flushing the gas sweeps down along the wall and blows out of the tapping hole or cinder notch. Although the temperature may be theoretically too low to melt fire brick, it is high enough to soften it so that it may be abraded by coke ground against it by the back thrust of the blast.

Added to this erosion is the attack of slag. While the composition of blast-furnace slag is frequently acid —that is, rich in silica and alumina—nevertheless, even when viscous with silica it will combine with avidity with more silica. This is because slags of even pronounced acidity as regards furnace requirements, are basic from a mineralogist's standpoint. Of greater significance, however, is the physical state of the slag and its effect on the facility with which the slag will attack brickwork. A thinly liquid slag will penetrate the interstices and joints of the brickwork more easily than will viscous, aluminous or mucilaginous, limy slags. Such slags tend to adhere to the walls and to freeze in cavities, whereas a fluid slag is more likely to drain from the walls at each cast and flush, and on rising it again attacks the exposed surface of the constantly enlarging cavities in the brickwork. All refractory materials tried are destroyed by the physical-chemical activities of heat, erosion, and slag, and with a sharp slag and highly heated furnace, corrosion will bring about an unperceived destruction of hearth walls in a very short run, the hearth walls sometimes losing 3 ft. of thickness.

Cracking of the Walls

The protected brickwork may be destroyed unless held solidly in a tight, jointless ring, with no opportunity to develop cleavage cracks through displacement by expansion. Fire brick expands approximately 0.5 per cent in volume on being heated to incandescence and before it vitrifies. Consequently, if the hearth walls are not held equally rigid about their circumference, that segment or wedge opposed by the least resistance will move out bodily, forming a crack from the inside to the outside face.

Practice varies in regard to the packing space between the hearth wall and hearth jacket; some plants use packing, others do not. The use of packing is based on the presumption that cracks are bound to develop in the brickwork, and that a ring of some material independent of the brick must be placed between the brick and jacket so that molten iron following a crack cannot penetrate to the jacket. Also it is claimed that packing allows for the inevitable adjustment of hearth walls that results from expansion stresses. The two claims are somewhat contradictory in that the packing is supposed to combat the effects of the cracking which it permits.

Breakouts Below the Tapping Hole

Where rolled-plate jackets are provided for holding in the hearth brickwork the spray cooling does not extend down to the base of the jacket. Commonly it extends only to the level of the tapping hole, or perhaps up to 2 ft. below the hole, which is approximately the level of the hearth bottom. It is thought dangerous to have the bottom of the ditch about the jacket lower than the bottom of the hearth, because of the probability of very severe breakouts, and the jacket is bricked up solidly from this point down, completely around the furnace. The jacket usually extends 2 ft. 6 in. to 4 ft. 6 in. below the bottom of the hearth, and rests on second-quality fire brick, ordinary river brick, or even concrete, the lower segment of hearth being filled with fire brick of hearth and bosh quality.

Under these conditions it is apparent that this mass of brickwork without water cooling comprises a highly heated reservoir, which continually attains higher and higher temperatures and affords ideal conditions for melting and penetration of the bottom brickwork by iron. This is found to be the case. Upon blowing a furnace out the brickwork of the hearth bottom is seen to be replaced by a mass of pig iron, or a mixture of pig iron, slag and graphite, varying in depth from 4 ft. to, in one instance, 26 ft. below the tapping hole. Comparatively shallow depths are usually liquid, while deep pockets are usually solid, or, unless drained, solidify after the furnace is blown out. These masses of material have long been known as "salamanders."

Formation of Salamanders

Whenever a furnace shows indications of such a condition there is danger of an explosion if the iron comes in contact with moisture. Even if the hearth alone becomes unusually deep the danger of a breakout is increased, for as the iron in the hearth becomes lower than the brickwork inclosed by water-cooled jackets, it begins to eat outward. The deeper the hearth becomes the farther downward the hearth walls extend and the greater is the lateral pressure owing to the increasing head of liquid iron. Once displacement is fairly started by reason of bricks insecurely tied in, uneven shape, thick joints, inadequate anchoring by the hearth walls, or shrinkage cracks, the iron, as the hearth becomes deeper, automatically acquires an increasingly uncontrollable and destructive power, and tends to penetrate downward and laterally into the brickwork. The danger which threatens if this deep pool of molten iron suddenly breaks through is evident. To date, the efforts of furnace men and engineers to prevent the formation of salamanders have failed. Except on special grades of iron and on a few cold-blast furnaces, a salamander always forms to a greater or less depth and presents the annoying condition arising from a pool of iron that cannot be removed through the tapping hole. So long as salamanders form there will always be uncertainty concerning the depth to which the iron is penetrating the distance to which it is working sideways, and the possibility of outbreaks beneath the tapping-hole level.

Breakouts Through the Hearth Wall or Jacket

Thus far, no material ever used in hearth bottoms has resisted the destructive agencies inside the hearth. The presence of graphite coatings on the hearth walls and in crevices in the salamander, which are seen when the furnace has been blown out, has presented the obvious suggestion of a lining of carbon or coke brick in the bosh, hearth and bottom. Theoretically, such bricks should be highly satisfactory, because they are infusible at the highest temperatures reached inside the furnace and resist the corroding action of slags, either basic or acid. Also, they are not acted on by molten iron, unless the iron is unsaturated with carbon, in which case the iron would probably satisfy its re-

quirements for carbon at the expense of the carbon brick.

So far as is known, these bricks are not now, nor have been for many years, used in this country. Many works abroad, and three works in America, have introduced them, thinking that a panacea for the preservation of the hearth had been found and that the costly work and expensive delay in removing salamanders would be largely eliminated. It was found, however, that the carbon brick were failures when used about the tuyere breast and the tapping hole; that the hearth bottom tended to float up and disappear; and that if even the smallest gas flame issued from the joints between the brick a hole formed in a few minutes which steadily grew larger, and had to be stopped with fire clay, so that a prejudice against their use developed in this country. They are, however, used abroad, but do not appear to possess any advantage over good fire brick.

Subjackets are sometimes used to reinforce hearth bottoms. With the exception of the water-cooled subjacket, difficulty is found with any of them when used beneath a steel-plate jacket that is spray cooled, and when the bottom of the water ditch about the jacket is 2 ft. or more above its base line. It has repeatedly happened in such cases that the surrounding brickwork has become so hot that the subjacket is melted or cut and the iron has come through. It is clearly established that positive water cooling must extend down to the bottom of the hearth jacket if the subjacket is to be of value. So many subjackets have been found cut from top to bottom that several plants cool the subjacket or bands by means of 2-in. extra heavy pipes, set vertically about the outside of the jacket or band, on 10-in. centers. These pipes are welded or otherwise connected at the bottom to form a gooseneck circuit.

Probably the most courageous method of combating the penetration of iron into the bottom and the formation of a salamander is the placing of jamb pipes inside the hearth brickwork and extending from the top of the hearth jacket, between the hearth and tuyere jacket, diagonally downward to beneath the bottom of the hearth. Until this construction has been thoroughly tried out, few furnace men will admit that any good can come of it.

On the basis of inquiries made, it seems that about 35 per cent of the furnaces in this country make the salamander the hearth bottom. The men in charge of these furnaces have come to the conclusion that regardless of the kind of brick or construction employed the bottom will disappear to a certain depth, and that if the iron should by any chance go any deeper, no harm is done. The view has also been advanced that the iron eats to a certain depth at the first blast, then solidifies into a permanent block, which undergoes no change during the remaining life of the furnace. This solid mass of cast iron, it is claimed, is more effective than the best brickwork in preventing breakouts, because it is without cracks or joints, and, from its high heat conductivity, will dissipate heat quickly and freeze any iron that may be lowering the bottom. In support of this view, instances have been cited where, on blowing the furnace out and tearing out the brickwork between the jacket and salamander, a distinct and separate layer or skull of iron could be seen on top of the old salamander from a previous blast. This skull represented the new salamander, and goes to support the theory that once the lower part of the salamander formed on the first blast is solidified in any way the hearth temperature never after becomes high enough to remelt it.

Attention to Signs of a Breakout

The cast-house crew should be instructed to pay particular attention to any indications or signs of breakouts. Although breakouts through the hearth jacket above the tapping-hole level are frequently sudden and without warning, nevertheless indications are not always lacking; the jacket may get unusually hot and steam heavily, or the water discharge from the cooling pipes set behind the jacket, or in plates or jacket segments, may start to steam and boil.

Impending breakouts beneath the tapping-hole level are indicated as follows: The pavement and brickwork about the jacket may become abnormally hot; the base itself, if not inclosed, may get unduly hot; the columns, if uncooled, may become too hot to touch, or, if cooled, the discharge water becomes very steamy; steam or gas, the latter igniting and burning with a bluish flame, may issue from the cracks and joints in the pavement and in the brickwork about the columns and jacket. "Losing the iron," and flames about the base, are unmistakable signs of lowering of the bottom, undue penetration of iron to moisture-impregnated brickwork, or a breakout.

Tapping-Hole Breakouts

With hearth jackets and hearth brickwork strongly constructed and copiously cooled, the weakest point is immediately over and at the tapping hole. The iron notch is expected to withstand the erosion of fluid iron forced out at high velocity, the slagging action of cinder, which begins to come out with the iron during the latter half of the cast, and the cutting of the gas or blast sweeping down from the tuyeres when the iron sinks to a low level in the hearth near the end of the cast. To withstand this action, there is provided simply a plug of fire clay, which fills the opening left in the hearth walls at lining, 6 in. by 24 in. by 36 in. in size.

Perhaps the chief difficulty in stopping the tapping hole is that the clay is likely, unless the gun is handled correctly and the clay mixed properly, to fill the hole straight ahead and not flatten out about the edges on the inside hearth walls or close up the uneven places and eroded channels in the hole itself, so that the stopping is neither safely keyed in nor firmly packed into the irregular contour of the tapping-hole surface. The clay is mixed to such plasticity that when squeezed in the hand, it will flow between the fingers only slowly or with difficulty. As a rule, a high grade of gray, weathered, flaky fire clay is used, because a red or yellow clay containing upward of 5 per cent of iron oxide may set too hard, although in certain districts yellow clay is used without difficulty.

When the hole does not take clay freely, it is the custom to fill the gun barrel about half full of clay, then pour in half a pail of water, or loam and water, and force the clay and water into the hole. This thins the clay so that it fills the hole tightly. Many plants use water in the gun regularly. In this case, the larger part of the first barrowful of clay, if two or more are used, is fed; then about half a pail of water is poured into the gun funnel after the barrel is well filled with clay, and the load shot into the hole. This procedure may be repeated a second and third time.

Cinder-Notch Breakouts

The cinder-notch, as it is used to "flush" or drain the slag from the hearth previous to casting, being subject to erosion and attack of slag during 12 to 18 "flushes" a day, would last but a short time if it were simply built up and stopped with clay without the blast being taken off. In fact, a clay notch could not be used unless stopped in exactly the same way as the iron notch, and this would mean turning off the blast a prohibitive number of times. Consequently, in the cinder-notch arch or opening is placed a bronze cooler, similar to a tuyere cooler; within this bronze cooler and extending inside 6 to 12 in. is an intermediate cooler, and inside the intermediate cooler is the "monkey," also water-cooled, which projects in about 3 in. The monkey has an opening 2 to 2½ in. in diameter, and is stopped by an iron "bot" or plug which chills the cinder key. The only danger of breakouts about the cinder cooler is escape of cinder between the large cooler and the brick walls, a rush of cinder when the intermediate cooler is changed, outbursts of slag and flame when the monkey is changed, or an explosion of the intermediate and the large cooler. If iron comes over the monkey by accident, it may cut the bronze and come in contact with the water inside, when all three coolers may be blown out of the furnace, and an outrush of furnace contents follow.

Breakouts about the cinder-notch cooler are minimized by painstaking care in setting and packing the cooler, which usually should be done after the kindling and scaffold have been placed in the hearth and bosh,

and before the furnace is filled preparatory to blowing in.

The packing more generally used, and the firmest, is rope asbestos saturated with water, rammed in tightly all around from front and back with light blows of a sledge. Clay is usually plastered on the face of the brick before the cooler is inserted, and the asbestos rope is used to make a tight fit. W. L. C.

British Steel Trade After the War

In England the question of the distribution after the war of that country's greatly increased steel output is receiving thoughtful attention. The following editorial comment in the London *Ironmonger* of Oct. 27 shows the drift of sentiment:

With the growth of our production of iron and steel the question of the conversion of the industries from war work to work for civil requirements is becoming more pressing as time goes on and if peace should come soon there is danger that the whole trade may temporarily be thrown into a state of chaos. The conversion of a number of blast furnaces to the production of basic iron is a predominant factor and, if the production of this class of iron is persevered with and the best use made of the ore which is obtainable in England, we should have a fair chance of taking over a considerable proportion of the trade in the cheaper grades of steel which was formerly in the hands of Germany and Belgium. The latter country is not likely to export for a long time after the war and the demand for steel from all quarters of the world will be so great that Germany, if she is again allowed to trade with her present enemies and if her production should remain in excess of her own needs, may be in a position to step back at once into a large portion of her former export trade. That probability must be taken into account, for it is very doubtful if effective measures could be taken to prevent Germany from exporting commodities if people abroad are willing to buy them and shipping space is available. Much, if not all, of her former export trade with this country, however, will perhaps be lost to her and our home producers should then not only be able to satisfy most of the needs of the United Kingdom, but should have a good balance for export and that branch will have to be very strongly pushed.

The American producers will have to be reckoned with, particularly in the South American, Indian and Australian markets where they have already seized during the war a good deal of the business that formerly came to Europe and on the question of quality of the goods we have little or no advantage over America.

The development of our rolling and other manufacturing plants during the war should give this country a sound foundation from which to work up the trade in plates, sheets and structural steel of all kinds. The cutting away of Continental supplies has been a blessing in that it has forced our manufacturers to develop their plants in a manner they could never have hoped to attain in times of normal foreign competition. The United States is better placed now than before the war; Germany remains for the present a doubtful quantity, but British iron and steel plants, as a whole, are better now than they ever were and it is for our manufacturers to see that the best use is made of them.

The enormous increase in our capacity for producing steel, which will probably be augmented by a further 20 per cent during the coming six to twelve months, is a factor that should have a very potent influence on the country's prosperity after the war, if reasonable measures are taken for the standardization of products and the abolition of the old system under which most iron and steel mills turned out almost every variety of rolled product. That system may have had its advantages but its disadvantages were manifest, the chief being that it was almost impossible to compete with Continental makers who were confining their attentions, as far as practicable, to the manufacture of one class of steel goods at one works or group of works. This arrangement prevented small quantities of one size of bar, angle, channel, tee, and so forth being rolled at several works at once, with the ensuing frequent stoppages of mills and changing of rolls. It is one thing to get the country's production of steel up to record figures during the present war stress (in itself no mean achievement), and another to maintain such a production under peace conditions, and there may have to be some measure of centralization of the country's resources. However, Government control will have to go as soon as possible after the cessation of hostilities. That control is now accepted as an unavoidable evil; but after the war is ended producers will take a lot of convincing that any measure of Government control of output is necessary, particularly if it is exercised by a horde of civil servants.

The future of the British steel trade is also discussed as follows by the London *Times:*

The preliminary reports presented by the Metallurgical and Mechanical sections of the Steel Committee appointed by the Iron and Steel Institute, must be regarded as a powerful indictment of the manufacturing methods, coming from those engaged in it, of what we have been accustomed to regard as one of our primary industries. The work assigned to the committee included a comparison of open-hearth and rolling mill practice at home and abroad, and the reports now issued are founded on replies to questions submitted to British firms. The basis from which they start is that the output of British establishments, even allowing for the difficulties of making a true comparison, is considerably below that of competitors in Germany and the United States. The chief causes assigned for this inferiority are costly and apparently inefficient labor, and inferior design and layout. The higher wages paid in proportion to output in Great Britain are certainly an important factor, but there is a disposition to question the figures given in the committee's report, which suggest that the wages bill for an equal output of steel melted is, on a pre-war basis, seven times that of the German manufacturer.

On the subject of rolling mill practice British manufacturers are at a disadvantage by reason of the non-adoption of specialization, but it is not contended that the British mill equipment lags behind that of foreign works as regards either design or construction. The suggestion that the British steel trade should establish a central board to which all orders would go, and from which the work would be allocated to different mills according to their ability to handle it, implies a species of combination which is coming to be viewed with favor in other than the steel trades. That some action is necessary was shown clearly by the statement made by a well-known authority in the discussion which followed the presentation of the reports that, unless the defects of our manufacturing system to which the committee direct attention receive consideration, there is no economic future for at least one-half of the British steel trade.

German Embargo on Steel

The German Ministry for War, the War Board and the Raw Materials Department issued a new order, effective Oct. 18, putting an embargo on all existing stocks and on the new production of iron and steel bars and shapes, sheets and tubes and castings. The use of these materials is only permitted in work that does not apply to new plant, extensions or reconstruction. For these an emergency certificate has to be obtained. The veto, however, does not apply to material for railroad bridges or for maintenance work in mines. Structural firms and those engaged on reinforced-concrete work are also required to notify the War Board of the stocks held by them on the first of every month, except in cases where the stocks of the same shape and cross-section do not exceed 10 cwt. on that date.

Lead Output in 1917

The lead production of the United States for the first half of 1917, according to C. E. Siebenthal of the U. S. Geological Survey, was 306,062 net tons as compared with 571,131 tons for all of 1916. Exports of domestic lead to July 1, this year, were 29,241 tons, as against 100,565 tons in all of 1916. Lead available for consumption on July 1, 1917, was 268,995 tons. It was 461,173 at the end of 1916.

The prevailing high prices of hematite iron ore of good quality has stimulated this class of mining in Ontario and Quebec. One of the companies recently incorporated in Canada is the Canadian Union Iron Mines Corporation, Montreal, with a capital stock of $1,000,000, which intends opening deposits near Sutton, Que., where hematite iron ore has been uncovered analyzing 68 per cent metallic iron. This company has already commenced operations at another mine near Perth, Ont., from which it is said there were several thousand tons of iron ore taken a few years ago.

The spring convention of the National Machine Tool Builders Association will be held in Atlantic City, N. J., probably in May.

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Mobilizing Man Power

Industrial labor is the paramount problem of the war. To say so is telling nothing new, but now and then, as in the urgent call of Lloyd George last week for word as to the day when the United States would have a million men in its army in France, the emphasis is put on the need of a large fighting force. But the Secretary of War, in an appeal to the trade and technical press of the country, makes it plain that the need yonder is more pressing to-day for American mechanics and workers in other employments auxiliary to the army than for men specially trained to fight. The call is sounded on other pages of this issue and readers of THE IRON AGE are urged to help in making a prompt and adequate response.

It may be said that iron and steel and metal-working industries need every man now employed. But that is not to say that adjustments cannot be made in scores of places, by putting on less skilled men and training them to do the work of others whose skill can thus be released to back up the army in France. The task of sifting labor so as to insure a full supply for the work that is most vital to the winning of the war must not be left to Washington where men are over-burdened day and night with war loads. Manufacturers in every line must make this a personal problem.

Just now aviation is pressing its demands, and in this connection emphasis is put upon the announcement that men subject to the draft will not be permitted to volunteer after Dec. 15.

It need not be said that the shipyard labor problem has first place in the large plans that are having right of way at Washington. At 100 points the recruiting of shipyard forces through Government organization is under way, and yet in the New York district alone, including New Jersey, probably 30,000 more men will be required for shipyard work before April 1. It has been assumed too quickly in some comment that the release of labor from so-called non-essential industries is the main solution of the shipbuilding situation. Housing is equally important. In its plans for feeding its Mobile yards with steel the Steel Corporation includes the quick construction of 1000 houses at Fairfield, Ala. On Staten Island and in New Jersey the call is immediate for the building of hundreds of houses. It has been shown in coal mining that more men is not the desideratum so much as more cars and less whisky and beer. Short car supply is credited with only 13 per cent of the 26 per cent shortage in coal production reported by the Government for the six weeks ended Nov. 10.

The labor question, as is being proved every day, is not simply one of shifting blocks of men from one industry or district to another industry or district. It may be that a labor census by employments in much greater detail than has been attempted should be undertaken at once. There would be much help also from an early canvass of industries to classify them as essential, less essential and non-essential. But it should be appreciated right at the start that sweeping orders from Washington will not meet the situation and that this imperative labor adjustment which must go on steadily will be for the most part a hand-picking operation calling for widespread co-operation. Dilution by unskilled labor is under way; but it must proceed faster and there must soon be some revolutionary moves in the hiring of women to replace men.

Steel for the "Unessentials"?

The wish has sometimes been expressed that the steel industry had an analysis of the destinations of its products. Often as general business conditions change or as the relations between industries change it would be very advantageous to the business man to know where the steel goes, and in what form. While the uses of steel are wellnigh infinite it would not be impossible to list by ultimate destination by far the greater bulk of the steel that leaves the mill. In individual branches of the industry analyses are frequently made, but instead of their filling the general want the fact that they are attempted in such fragmentary form indicates how useful a general classification would be. Even as to the greatest single customer of the mills, the railroads, there has been much divergence of opinion or estimate. By co-operation, through such a body as the American Iron and Steel Institute, for example, a work of this sort could be accomplished.

Hitherto the demand for such a compilation has been merely spasmodic or sporadic, but now it is general, by reason of the Government's program to curtail operations in unessential indus-

tries. It is the intention of the Washington authorities to avoid publicity in the work of curtailment, but the observer can pick out unessential or relatively unessential industrial activities much better than he can judge the amount of steel they normally consume.

In a general way, however, there is ground for assuming that even an extensive curtailment in unessential industrial operations would not directly affect the demand for steel to any great extent. Directly for the prosecution of the war there will be required by the Government and its Allies an amount of steel which has been variously estimated at 30 to 40 per cent of the output at the rate of the past few months, with the latest developments pointing to the higher rather than the lower figure. Thus an extensive curtailment would be forced by lack of supply, and the curtailment at the instance of the Government could only begin where that left off, and would apply not against all tonnage, but against only about two-thirds of the tonnage.

Judge Lovett is quoted to the effect that there will be no more priority orders of the nature of order No. 2, which prohibited the use of open-top cars for carrying materials for building or repairing roads, sidewalks, etc., for places of amusement, or manufacturing passenger vehicles and furniture. That order could only affect the steel industry very slightly. A small tonnage of structural steel would be involved, perhaps, in connection with road building and repair. Theaters and other places of amusement do not consume steel in anything like the same proportion of total cost as obtains in the case of hotels, office buildings and factories. The only steel used in connection with furniture manufacture is transported in box cars. As to passenger vehicles, curtailment in production is occurring partly through decrease in demand and partly through the factories being given war work.

One of the rules it appears will be followed as far as possible is to effect curtailment in the production of unessentials by giving manufacturers war work to do instead. On the whole such a diversion would not reduce the consumption of steel, for naturally the plant that has been using steel for the production of something deemed unessential would be given work of the same general character, utilizing the plant equipment, and thus the consumption of steel at that point would continue.

Manganese in the Basic Open Hearth

It is a common contention that all the manganese introduced in any form in the early stages of the open-hearth process is practically lost so far as its appearance in the final steel is concerned. In his article in this issue, Mr. Newton suggests that by the use of high-manganese pig iron in the basic open-hearth process, a point may be reached where the equilibrium between the composition of the slag and the metal may be such that manganese, amounting to a considerable saving, ultimately remains in the steel. The idea is worth serious consideration and trial in these days when manganese conservation is so live a topic. If it is practicable, it affords a means of employing certain domestic manganiferous iron ores so as to reduce the ferromanganese commonly necessary, as well as to produce a better steel. The supply of such ore of suitable composition is very large.

The objection offered to this metallurgical practice, that there is a decided waste of manganese in the slag, is not as serious as it appears. Such basic slags, high in manganese, are being used in regular blast-furnace charges, producing a pig iron higher in manganese and effecting an economy in other factors such as lime. Their use also would somewhat lessen the amount of manganiferous iron ore necessary to secure the end suggested.

Mr. Newton's article also gives an idea of the extent to which spiegeleisen has replaced ferromanganese during the war. It appears that at the end of 1916 of the total manganese theoretically employed in making steel 15 per cent was used as spiegeleisen and 85 per cent as ferromanganese, whereas in the three years previous to the war the ratios were 10 per cent and 90 per cent respectively. It is probable that the spiegeleisen percentage has been further increased this year.

The effect of using manganese ores from many sources is shown by the decline from a 79 or 80 per cent manganese content in the years previous to the war to an alloy containing only a little over 76 per cent in the war period. The manganese content of the spiegeleisen has not changed appreciably in the same time.

Co-operation No Transient Phase

An important development in the relations of business men with each other and with the Government will be overlooked if the co-operation now practised in carrying on the war be viewed as a transient phase in men's affairs, to be dismissed as useless when the war ends. It is true that the war has emphasized the desirability of co-operation, but it has not made a distinction that co-operation is useful only for winning a war. Prosecuting this war is largely the utilization of industrial resources, and there is the same occasion for utilizing industrial resources in time of peace as in time of war. It is the object only that is different.

When the Federal Trade Commission was established many business men received advice of counsel that it had practically no legal authority, while from the practical standpoint it was thought that it would require many years of development, aided perhaps by additional legislation, for the commission to become an important factor in the conduct of the commerce of the nation. It had required a very long time for the Interstate Commerce Commission to develop real control of the railroads. It should have been obvious, however, that the actual developments in connection with the Federal Trade Commission's work would not be precisely determined by law, but would depend in fact upon a variety of circumstances—the personnel of the commission from time to time, the spirit shown by business men, in working with it or endeavoring to resist its activities, the changing needs of commerce, and various other matters. Even in the interpretation of laws long on the

statute books there are gradual changes. If the Northern Securities decision was not a reversal of the Knight sugar trust decision it was a step in that direction, several such steps having since been taken, and the power of the Federal Trade Commission, recognized by law or by common consent, could certainly increase, and more or less rapidly according to circumstances.

The war is such a circumstance. It has greatly broadened and quickened the activities of the commission. Those activities, directly the result of war needs, are so intimately associated with the peace functions prescribed for the commission that they cannot be expected to cease when the war ends. The purpose may be slightly different, and yet perhaps not so different after all. The commission has been directed to inquire into costs of production, so that the paying by the Government of unfair prices for commodities may be avoided; but simultaneously the principle is established that the same prices shall apply to the public, and the public's needs will remain after the Government has ceased waging war.

It certainly would appear that many have misused the precedent of the Interstate Commerce Commission in seeking light on what might be expected of the Federal Trade Commission. The matter was not well illuminated from one angle, that of the early accomplishment of the Commerce Commission in abolishing rate wars, rebates and passes. The Trade Commission is already proceeding along lines essentially similar.

A very significant instance is given in this official statement of the Federal Trade Commission made late last week:

> The Federal Trade Commission to-day made a long step forward in correcting of certain trade abuses when manufacturers of 90 per cent of the printer's ink made in America, personally or through representatives, voluntarily agreed to sign a stipulation to eliminate the practice which has been prevalent among some manufacturers of giving commissions to the buyers of their ink. The agreement was reached following a meeting at the Trade Commission to-day, which was called at the request of the ink makers.

The courts have been unable to draw clear distinctions, if indeed any at all, between abolishment of unfair competition and abolishment of competition, by co-operative work among sellers. In the incident recorded above the Trade Commission has been glad to sanction and approve an agreement among manufacturers at which the courts in all probability would have looked askance. Commissions to buyers of printer's ink and rebates to large shippers are essentially in the same category.

At the outset the Trade Commission expressed its commendation of trade associations, pointing out various directions in which they could be of use, and for the clear purpose of enabling their members to make more money. A species of injurious if not unfair competition is the cutting of extras. Not merely under the approval, but rather under the instruction, of the Government the American Iron and Steel Institute has been promulgating standards of extras, differentials and analyses for the purchase and sale of iron and steel commodities. The methods of such procedure may change after the war, but the essence of the activity will undoubtedly remain.

Co-operation of manufacturers and business men generally, among themselves and with the Government, is being encouraged, and this must not be considered a transient phase, an incident of war to pass afterward. The idea of co-operation had taken a strong hold upon business long before the war, and it had been formally recognized, if not distinctly by the action of Congress in passing the act constituting the Federal Trade Commission, at least distinctly by the commission itself when organized. What the war does chiefly is to afford opportunity for a striking illustration of the benefits of co-operation, and that lesson once learned is not going to be forgotten.

CORRESPONDENCE

For a Pig-Iron Reservoir

To the Editor: This war is bringing to the understanding of every intelligent citizen the fact that the underlying basis of a nation's power and wealth is its possession of iron and coal, and its capacity to use them with intelligence.

Nature has given to the United States an ample supply of iron and coal, but as far as making the best use of them is concerned our nation is as far behind Great Britain as can be imagined. For instance, Great Britain for more than half a century has carried a reserve stock of pig iron equal to six months' production, and at one time for five years in succession carried more than twelve months' production. The United States during this same half century has carried a reserve stock equal to less than three weeks' production. These conditions enabled England in the first year or more of the war to supply herself and her Allies with tremendous quantities of war materials. The reserve supply was so great that there was hardly an appreciable advance in price during the first year or so of this great demand. Whereas, in the United States, with little or no reserve stock of iron, the war demand quickly carried up its price several hundred per cent, and the whole business of the nation is being held back in consequence of an inadequate supply of iron.

No nation can afford in times of peace to maintain a capacity to produce iron sufficient to supply its need in times of war; consequently, every nation should accumulate in time of peace a sufficient reserve stock to supply its need in times of war.

There has been, since the beginning of war in this country, such perfect silence upon this great question that I am quoting below from a recent circular of Matthew Addy & Co., which shows that at least one business concern in the country appreciates this great question:

> A few weeks ago the question in the iron trade was, How high will prices go? Now the question is (and a far more vital and important question), Where will all the iron come from that is needed? Much more is needed than can be supplied. Demand continues unabated. No consumer has been able to accumulate pig iron, and practically all consumers are going into the winter with their storage yards absolutely empty. There never was a time when a reserve stock of iron was so urgently needed by the country as at present, but there is no surplus whatever, and each day's output of the blast furnaces is needed to keep the mills and foundries in operation.
>
> For years economists have been preaching the necessity for a great stock of iron—iron to be piled up in something of the fashion in which Joseph gathered grain during the seven years of plenty, or like the manner in which a nation heaps up coin in a war chest during prosperous peace times so as to have it immediately available in case of pressing emergency. Had we now such a reservoir of iron it would be of inestim-

able value. The trouble has been that every time in the past when iron began to accumulate and it was evident production was ahead of consumption, market prices fell until ironmakers faced a positive loss.

Evidently there is something wrong in our system, though no one has yet found a practical way to remedy the trouble. Certain it is, however, that if all the furnaces which were idle during the lean years—between 1908 and 1914—had been able to run and make iron, to-day the iron so made and put aside against the day of need would be a national asset worth more than any mere figures would show. That iron would go a long way toward winning the war. But as it is, we are on a mere hand-to-mouth basis. Furthermore, iron production is being pitifully curtailed and hampered because of a lack of coke.

THE IRON AGE reaches such a vastly large proportion of the whole mechanical business of the nation that I ask you to publish this letter, together with the quotation from the Matthew Addy circular.

GEORGE H. HULL,
President American Pig Iron Storage Warrant Co.

New York, Nov. 27, 1917.

Following Up Purchase Orders in Small Plant

To the Editor: In a recent issue of THE IRON AGE there appeared an interesting account by H. A. Russell of his system of following up urgent purchase orders. The writer believes that an outline of a method employed in a small plant where the purchases are only a few daily will also be of interest.

Three copies of the order are made, the original being mailed, the duplicate or green copy remaining in the office and the triplicate or yellow copy going to receiving clerk. Every morning before the green copies are filed away the purchase order number and the name of the firm to which the original was sent are entered on a small white card. These cards are then placed in a small tray, which has two sets of monthly guides, one marked "current" and one marked "proximo." There is a third division marked future, but without guides. These follow-up cards are placed behind the dates upon which an acknowledgment would be reasonably expected. When this date arrives a form postal card is sent to such concerns as have not replied, the idea being that some reply must be exacted, no matter how indefinite as to promise, to show that the order was not lost in the mail.

The green copies are placed in a case having several compartments. There are many firms from which goods are ordered frequently, and each has a compartment of its own. All other orders are placed in the one marked "miscellaneous." When the mail is sorted each morning all letters pertaining to these purchase orders are placed on a clerk's desk. The dates of shipment are noted on the follow-up cards and also on the backs of the green copies.

Once every day the receiving clerk sends in the yellow copies of such orders as have been completed or partly filled. The green copies of the former are then destroyed as are the white cards, if both sides have been used, and the yellow copies filed away for future reference. The part shipments are listed on the green copies and the yellow ones returned to the receiving department. Before noon of each day the white cards are taken from behind the date guide of that day and either the aforementioned postal card sent, or the necessary follow-up letter dictated. If it becomes advisable to write about an order before it would appear chronologically, it is an easy matter to locate the white card, make notation of the follow-up date and place it ahead for future attention.

The cards grouped behind the "future" guide refer to those orders which are not promised, or specified as not wanted, until after the approaching month. These are looked over each week. On the first of each month they are sorted out as then many of them become eligible to a place in the proximo group. If at any time the orders should become too numerous to locate a card easily either in the current or proximo group, a cross-index could be instituted by having a card for each order number, noting thereon the date back of which the follow-up card would be found.

To make sure that all material affecting any certain customer's order is not being overlooked, a sheet is kept on the buyer's desk and opposite each factory order is noted the purchase order number for the raw material.

Not the least merit of this system is the little time each day which it takes to keep it going.

H. D. MURPHY.

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Congestion Causes Alarming Conditions

All Railroad Lines East of Chicago to Be Operated as One System—Steel Plants Compelled to Close on Account of Fuel Shortage

WASHINGTON, Nov. 27.—In a desperate attempt to relieve the congested condition of railroad transportation throughout the eastern part of the country, which has resulted in heavy reductions in the output of munition plants and coal mines and which seriously threatens the building programs of the United States Shipping Board and the Navy, the Railroad War Board has decided upon the operation of all railroad lines east of Chicago as one unified system. Cars and trackage facilities, regardless of ownership, are to be pooled in the effort to obtain a maximum of efficiency in traffic movement. A committee of vice-presidents of the pooled lines will operate the roads under the general direction of the Railroad War Board, which is composed of five of the best known railroad men in the country. The operating committee will be clothed with full authority and will consider only the general welfare, irrespective of the policies or special interests of the pooled lines.

As officially announced, the operating program will include (1) diversion of locomotives, employees and machine tools from Western to Eastern railroads; (2) utilization of repair shops on Western lines for repairing Eastern equipment; (3) pooling of all tracks and equipment in the East wherever practicable; (4) pro rata distribution among Eastern roads of open top cars on a basis of tonnage carrying capacity of the equipment in the pool, and (5) diversion from congested lines of all freight that can be handled by any open route.

Steps Recommended

With a view to rendering the pooling arrangement more effective, the Railroad War Board has recommended that the following steps be taken forthwith by the Federal Government:

Survey the present contracts and methods of purchase and shipment of coal that cross hauls may be eliminated and that coal may move on the shortest route from producer to consumer. Extend the pooling of coal production and shipment. Transfer as far as possible the movement of foodstuffs and other export commodities to Southern ports to relieve congestion in North Atlantic ports. Survey all Government requirements involving the movement of raw materials and manufactured products, so that accumulations on roads and in terminals may be eliminated while products are awaiting shipments or export. Require wherever possible the building of war industrial plants in territory other than the Eastern seaboard.

If the measures suggested by the Railroad War Board do not prove effective in relieving the present situation, the board will immediately demand the execution of the policy recently outlined in a recommendation to the War Industries Board, cutting off coal and transportation from the so-called non-essential industries of the country. The board's original recommendation included a list of 524 products, the majority of which it was asserted could easily be dispensed with, while no great embarrassment would result to the Government or to the consumers at large if the production and distribution of the entire list should be suspended. Judge Lovett, the priority officer, appreciating the effect of such a blow upon a large number of industries, declined to indorse the Railroad War Board's recommendation, declaring that the use of such drastic measures to control the situation might easily precipitate a panic. Steps have since been taken, however, through the authorization of a Bureau of Manufacturing Resources, to attack this big problem conservatively and in careful detail, and it is altogether probable that, should the pooling of the Eastern roads fail to relieve existing congestion, the War Industries Board will at once direct the new bureau to begin the work of discriminating against non-essential industries.

Would Prevent Cross Hauls

It is understood that the War Industries Board will at once adopt the recommendations of the railroad board as to federal activities to relieve the transportation situation. It is a well known fact that enormous quantities of coal have been transported from one section of the country to another by cross-hauls which could have been eliminated if the entire subject of coal supply had been carefully studied from a National standpoint. The Fuel Administration has not thus far devoted much attention to this phase of the difficult supply problem, but, acting upon the recommendation of the Railroad War Board, will take it up at once with a view to working out a system by which all large consumers will obtain their coal from the nearest mines, while the general distribution for industrial and domestic purposes shall be made with a view to reducing the mileage of coal cars to a minimum.

The pooling of coal production and shipment, so far as it has been attempted in certain districts, has worked very well, and the broad extension of this plan is likely to result from the railroad board's recommendation. The Fuel Administrator, during the past week, approved a producers' pool formed in Cleveland to handle shipments of coal from mines in Ohio, West Virginia, and a part of Pennsylvania, with the possible addition of Tennessee and Kentucky.

One Plan for Relief

A substantial measure of relief is promised through the adoption of the recommendation that the movement of foodstuffs and other export commodities be transferred from North Atlantic to South Atlantic ports, with a view to relieving congestion in Northeastern territory where conditions are now must acute. There is no reason why the commodities referred to cannot be sent abroad through Southern ports, and if this is done it will relieve the rails and terminal facilities now greatly needed for the handling of coal and munitions in Ohio, Pennsylvania, West Virginia, Maryland, Delaware, New Jersey and New York.

The records of the War Department show very large quantities of raw materials and manufactured products that have been piled up in storehouses or on cars awaiting unloading, the bulk of which are intended for exportation but the shipment of which is not now immediately required. These goods have been accumulated by the Commissary, Quartermaster and Ordnance Departments with commendable enterprise and forehandedness, but the result has been to congest the railroad and storage facilities to an extent that has added greatly to the problem now confronting the Government. It is believed that a careful study of this phase of the subject will result in considerable relief, especially in the releasing of cars now loaded with war material.

Location of Industrial Plants

The suggestion that wherever possible the war industrial plants be built in territory other than the Eastern seaboard is interesting, but Government officials do not look for much relief from any change in policy in this respect. Aside from the three big Government-owned shipyards now being laid out and equipped, which it was absolutely necessary should be built on the Atlantic Coast, there are few industrial plants financed by the Government that have not already been developed to a point making removal impracticable. Under the direction of the Ordnance Bureau of the War Department a dozen or more forg-

ing, treating and machining plants have been constructed or extended for the manufacture of big guns and ammunition. In nearly all cases, however, there was a nucleus for each of these establishments in a private plant which undertook work with the Government's co-operation and financial assistance. It would have been difficult, even at the outset, to have located these extensions elsewhere, and as a matter of fact the expansion work has now proceeded to a point where production will begin in a short time. Generally speaking, the Government is disposed to locate manufacturing plants at a considerable distance from the Atlantic seaboard for military reasons, but the officials have felt obliged to pay some attention to the elements of transportation, convenient supply of raw materials, labor market, etc. Ordnance officials suggest that little would be gained by locating war industrial plants at distance from the Eastern seaboard, in view of the fact that the products of such establishments must be sent to the seaboard for testing and for shipment to Europe.

Many Appeals Received

Munition manufacturers are watching the twin problem of transportation and coal production with interest and not a little anxiety. Hundreds of appeals have been received in Washington during the past week by the War Department, the War Industries Board and the Fuel Administration, which indicate that the manufacture of war supplies, urgently required for the National safety, is jeopardized by freight conditions which have reached a critical stage, especially in Pennsylvania. A telegram received by Fuel Administrator Garfield from the Pittsburgh Coal Co. is typical of the calls that are now daily being made for relief from conditions that have reduced output in some cases as much as 50 per cent. It reads as follows:

It is out of the question for us to do anything for Bethlehem Steel under present car supply, as practically all the steel mills which we are supplying are partially shut down and unless the situation changes immediately, we figure they will not be able to operate after this week.

I advised you last Friday what the results would be unless transportation improved, so that you might place the responsibility where it belongs. The seriousness of the transportation situation in this district is alarming and must be handled in a vigorous way to avoid the disastrous results which will follow unless a remedy of some kind is put into effect at once.

A sharp controversy has arisen between the railroads and the coal operators concerning the responsibility for the present coal shortage. The coal men declare that they have mined coal in unprecedented quantities, but that the railroads have not supplied the cars to haul it away. To this the Railroad War Board answers that the operators are actually behind "full-time output," and that labor controversies in which the mine operators have become involved, and not car shortage, are the real reasons for the present situation. In this connection, Fairfax Harrison, Chairman of the Railroad War Board, has made public the reply to a statement by the National Coal Association to the effect that "bituminous coal production in the United States was reduced approximately 2,000,000 tons last week by car shortage and railroad congestion." He said in part:

The railways do not attempt to say that all the blame for failure to secure a larger production of coal should be put on the mining companies, but, on the other hand, the public should be made to know that the larger part of the failure to secure maximum output is due to causes under the control of the managements of the mines and not to causes under the control of the managements of the railways.

After allowing for all the shortage of production attributed by the Geological Survey to the railways, there still remains the much larger additional shortage of 2,209,000 tons a week, or 15,500,000 tons in seven weeks, which it was entirely within the power of the National Coal Association to produce and deliver to the public.

The President's Conference

The outcome of the President's conference with the officials of the four railroad brotherhoods held at the White House Nov. 22 has been inconclusive and unsatisfactory from the standpoint of the public. The railroads had placed their interests entirely in the President's hands, and Mr. Wilson, therefore, sought assurances from the labor leaders that they would accept Federal mediation and would pledge themselves not to precipitate a railroad strike during the war. After the conference, the President gave out a guarded statement to the effect that the brotherhood heads agreed "in case of any critical situation of the controversy * * * to consider any proposed solution in a spirit of accommodation and patriotic purpose." At the same time the brotherhood representatives made public a memorandum declaring their willingness to "discuss and consider any solution * * * if a situation should arise which threatens the interruption of transportation." In addition, it was stated that the brotherhoods had renewed their demands for higher wages, basing their stand on the ground that war conditions had increased the cost of living to such a degree that more pay is necessary for their existence. Subsequently, when it became apparent that these official statements were vague and unsatisfactory, certain administrative officials attempted to construe them into assurances that there would be "no Nationwide railroad strike during the war." More detailed adjustment was not attempted, it was said, because the brotherhood leaders "had no exact wage demands formulated and the method of relieving railroad finances for greater war efficiency had not been finally determined."

The Brotherhoods have already rejected the proposition that their wage demands be referred to the Federal Board of Conciliation and Arbitration, and while administration officials express the conviction that they will ultimately agree to abide by the decision of a special tribunal appointed by the President, the brotherhood leaders have been very careful not to confirm this suggestion. It is evident the labor leaders have determined to force the roads to raise wages and to rely upon the President to influence the Interstate Commerce Commission to increase freight rates under pending petitions for the purpose of absorbing the resulting increase in operating expenses. W. L. C.

German Substitute for Lycopodium

A substitute for lycopodium has been found in Germany. The London *Ironmonger* says that at a recent meeting of the German Foundrymen's Association a member described it. Lycopodium is a vegetable material which, before the war, was used for dusting or coating the molds in order to prevent sand from clinging to castings. Lycopodium came exclusively from Russia and there is none left in Germany now. Experiments showed that by a centrifugal process the dust, which is precipitated in the lignite briquetting works from the gas exhalations of the drying apparatus can be successfully used to replace lycopodium. The light dust particles, which contain a large percentage of paraffin, have the same properties as lycopodium, as may be seen when water is poured on them.

Contract for Wilputte Coke Ovens

The Wilputte Coke Oven Corporation, New York, has been awarded a contract for the installation of 25 Wilputte regenerative by-product coke ovens, with by-product equipment, as an extension to the present coke oven plant of the Algoma Steel Corporation, Ltd., at Sault Ste. Marie, Ontario, Canada. Work will be started immediately, and the construction is expected to be completed by July 1, 1918.

Crombie Steedman & Co., Ltd., of London, Liverpool and West Africa, have opened an office at 10 Wall Street, New York, and would be glad to receive catalogs and correspondence from sellers of corrugated galvanized iron sheets, bar iron, bolts, nuts and hinges for export to South Africa and the British colonies.

The Buffalo Union Furnace Co., Buffalo, has had plans prepared for a blower engine house and for alterations and additions to be made to Furnace C at its plant, Buffalo River and the Erie Railroad, at the foot of Katherine Street.

Iron and Steel Markets

GROWING STEEL DEMAND

Blast Furnace and Steel Works Situation Still Acute

Greater Activity in Pig Iron Under Fear of Shortage—Ore Prices for 1918

The week has seen an increasing demand for steel products both from the Government and from manufacturing consumers. Many of the latter are buying for requirements not directly growing out of the war. Steel absorbed by the Government and by war contracts is a growing factor and is made to seem still larger as output is cut down by coal and coke shortage.

Blast furnace and steel works operations are no better. At Youngstown steel is being produced at 50 to 75 per cent of capacity. Pittsburgh is suffering in less degree, but 15 to 20 blast furnaces there have been banked for a part of the week.

With the approach of Jan. 1, the date named in connection with present prices, some agitation of a lower basis for iron and steel products has started at Washington; but the trade itself calls for stability and it is pointed out that as only a beginning has been made in working under the new schedules they should not now be disturbed.

The larger producers have been practically a unit in carrying out the spirit of their agreement with the Government. Here and there higher prices have been charged and those who have thus profited have simply helped to head the industry into Government control.

In the Chicago district one producer is turning 75 per cent of its ingot output into war steel. In Pennsylvania, a large company with plants at three points is supplying from 60 to 70 per cent of its output to the Government and Government contractors.

While priority decisions are limiting the amount of steel going to some consumers, there is as yet no shutting down of plants, even in non-essential lines, though such steps may not be far off. A sharp falling off in steel specifications from automobile plants has come in the Middle West.

New inquiry for billets and sheet bars is larger than in months, and some sheet producers are finding difficulty in covering for their first quarter's supply. Steel mills are scouring the market for ingots or billets to make up their own shortages. A large tonnage of slabs for the Sparrows Point plate mill is sought in the Eastern market. In northern Ohio a quotation has appeared on slabs considerably above the Government's price.

While in the end the Government is expected to take nearly the full output of sheared plates, the supply for the general market is still considerable. The premium over the Government price is shrinking, and in the Middle West mills are less able to get 5c. For the 36 vessels the American Shipbuilding Co. is to build for the Emergency Fleet Corporation, 50,000 tons of steel will be required. At Chicago, 9800 tons has just been placed for the Submarine Boat Corporation, and 5100 tons for a local shipyard. Italy has been a buyer of plates to the extent of 22,000 tons.

The identical Pittsburgh-Chicago basing called for by the Government price schedules is causing some friction; for example, Eastern mills have been called on to send plates to Chicago and to accept 3.25c., Chicago.

Eastern bar-iron producers seek to establish 3.50c., Pittsburgh, as the market price, and have not yet made this quotation at mill. Some smaller iron rolling mills are asking 4c. and over. In the Eastern jobbing trade the outcome of the collision between higher jobbers' extras on bars, as long maintained, and the mill extras announced by the Steel Committee, is being watched with some interest.

That the Russian debacle will release locomotive capacity for domestic orders is of no little significance to railroads and shippers. Domestic car orders also may be more of a factor. The Union Pacific has just placed 3500 all-steel cars.

Foundries having Government contracts may find it necessary to appeal to the Government to get them enough coke to keep running. The probability is also that some steel producers will call on the Government to furnish coke to operate their blast furnaces, if they are to carry out their ship and shell-steel contracts.

Fear of even a greater shortage in pig iron has caused an active market for delivery in the first half of 1918. Some makers are withdrawing from the market for the first half, having sold all that they can deliver if fuel conditions get no better. In Illinois, 20,000 tons of basic iron have been bought, three-fourths to come from Chicago and the remainder from Southern furnaces. The $4 more that must be paid for Southern iron is causing a greater pressure on Northern furnaces to take care of Central Western foundries. The whole pig-iron situation is growing more acute, and Government intervention to secure prompt iron for castings needed for war machinery is very common.

Lake Superior iron-ore prices for 1918 are being discussed. In the first Government price fixing, in September, ore was not changed, being really low if $33 was fair for pig iron. Indications now are that the 1917 ore basis will carry over into 1918 unless there should be a slight advance to cover possible new increases in labor and transportation.

Pittsburgh

PITTSBURGH, Nov. 27—(*By Wire*).

Mill operating conditions in the Youngstown, Ohio, district, due to the shortage of fuel, show no betterment. This week the Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. are operating their finishing mills to only about 50 per cent of capacity. The Youngstown Sheet & Tube Co. still has one Youngstown furnace banked, one Hubbard furnace idle for repairs and another banked. The Republic Iron & Steel Co. has been able so far to keep its five furnaces at Hazleton in blast, but they are running light, making only about 75 per cent of usual output. The company has blown out Hannah furnace at Youngstown for re-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 28, 1917.	Nov. 21, 1917.	Oct. 31, 1917.	Nov. 29, 1916.
No. 2 X, Philadelphia...	$34.25	$34.25	$34.25	$27.50
No. 2, Valley furnace...	33.00	33.00	33.00	30.00
No. 2 Southern, Cin'ti...	35.90	35.90	35.90	24.40
No. 2, Birmingham, Ala.	33.00	33.00	33.00	21.50
No. 2, furnace, Chicago**	33.00	33.00	33.00	27.00
Basic, del'd, eastern Pa.	33.75	33.75	33.75	27.00
Basic, Valley furnace...	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh....	37.25	37.25	37.25	34.45
Malleable Bess., Ch'go**.	33.50	33.50	33.50	27.00
Gray forge, Pittsburgh..	32.75	32.75	32.75	29.95
L. S. charcoal, Chicago...	37.50	37.50	37.50	28.00

Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	....	....	....	$38.00
O.-h. rails, heavy, at mill	....	....	....	40.00
Bess. billets, Pittsburgh.	$47.50	$47.50	$47.50	55.00
O.-h. billets, Pittsburgh.	47.50	47.50	47.50	55.00
O.-h. sheet bars, P'gh....	*51.00	51.00	51.00	55.00
Forging billets, base, P'gh	60.00	60.00	....	80.00
O.-h. billets, Phila.....†	*47.50	....	....	55.00
Wire rods, Pittsburgh...	57.00	57.00	57.00	65.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia..	3.685	3.685	4.25	2.659
Iron bars, Pittsburgh....	3.50	3.50	...	2.90
Iron bars, Chicago.....	3.50	3.50	4.50	2.65
Steel bars, Pittsburgh....	2.90	2.90	2.90	3.00
Steel bars, New York....	3.095	3.095	3.095	3.169
Tank plates, Pittsburgh..	3.25	3.25	3.25	4.25
Tank plates, New York..	3.445	...	...	4.419
Beams, etc., Pittsburgh..	3.00	3.00	3.00	3.00
Beams, etc., New York..	3.195	3.195	3.195	3.019
Skelp, grooved steel, P'gh	*2.90	2.90	2.90	2.85
Skelp, sheared steel, P'gh.	*3.25	3.25	3.25	3.00
Steel hoops, Pittsburgh...	3.50	3.50	...	3.25

*Agreed prices. †As yet only a few sales made.
**The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 28, 1917. Cents.	Nov. 21, 1917. Cents.	Oct. 31, 1917. Cents.	Nov. 29, 1916. Cents.
Sheets, black, No. 28, P'gh	5.00	5.00	...	4.00
Sheets, galv., No. 28, P'gh	6.25	6.25	...	5.50
Wire nails, Pittsburgh...	3.50	3.50	...	3.00
Cut nails, Pittsburgh....	...	...	...	2.95
Fence wire, base, P'gh..	3.25	3.25	...	2.95
Barb wire, galv., P'gh..	4.35	4.35	...	3.85

Old Material, Per Gross Ton:				
Iron rails, Chicago.....	$36.50	$35.00	$34.00	$26.00
Iron rails, Philadelphia..	38.00	38.00	38.00	24.00
Carwheels, Chicago	30.00	30.00	26.00	20.00
Carwheels, Philadelphia..	33.00	33.00	29.00	21.50
Heavy steel scrap, P'gh..	30.00	29.00	27.00	25.00
Heavy steel scrap, Phila.	27.00	26.00	25.00	23.00
Heavy steel scrap, Ch'go.	28.00	28.00	26.00	23.00
No. 1 cast, Pittsburgh....	28.00	26.00	27.00	19.50
No. 1 cast, Philadelphia.	31.00	31.00	28.00	20.00
No. 1 cast, Ch'go (net ton).	23.50	23.00	20.00	16.00
No. 1 RR. wrot, Phila....	35.00	35.00	35.00	25.00
No. 1 RR. wrot, Ch'go (net)	31.00	31.00	28.50	23.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	$6.00	$6.00	$6.00	$7.00
Furnace coke, future....	6.00	6.00	6.00	4.00
Foundry coke, prompt...	7.00	7.00	6.00	7.50
Foundry coke, future....	7.00	7.00	6.00	5.00

Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	23.50	23.50	23.50	34.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	34.00
Spelter, St. Louis.....	7.75	7.75	7.75	13.00
Spelter, New York.....	8.00	8.00	8.00	13.25
Lead, St. Louis.....	6.37½	6.37½	5.62½	7.17½
Lead, New York.....	6.50	6.50	5.75	7.25
Tin, New York.....	80.00	77.00	66.00	45.25
Antimony (Asiatic), N. Y.	14.00	13.75	14.25	14.50
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	....	$6.00

pairs, and will also blow out Hall furnace at Sharon, Pa. It is operating only 75 per cent of its Koppers by-product ovens. Two units, comprising 102 by-product coke ovens, of the Youngstown Sheet & Tube Co. are also idle for lack of coal. The Brier Hill Steel Co. is not able to operate its open hearth steel works at Youngstown or its sheet mills at Niles to full capacity owing to the coal shortage. Last week a meeting of manufacturers was held at Youngstown, at the suggestion of the Chamber of Commerce, to try to devise some means of improving the situation, but nothing definite was done. The Republic, Brier Hill and Youngstown Sheet & Tube interests are all working on contracts for shell steel for the Government, and the shortage in fuel is cutting down output one-half. The car situation is also bad and shipments by the mills are made under great difficulties. The coal and car supply in the Pittsburgh district is nearly as bad as in Youngstown. Car service bureaus are doing their utmost to secure empty cars for shipment, but with little success. There is a coal famine in the Pittsburgh district and mills and domestic users are suffering alike. It is feared that unless the car supply increases very soon a large number of coal mines will shut down for lack of cars, and this will intensify the shortage in coal supply. Homer H. Johnson, Federal Fuel Administrator of Ohio, and D. W. Kuhn, Federal Fuel Administrator of Pennsylvania, are at work with the various coal carrying railroads trying to get them to route cars direct from leading coal mines to places of distribution, thus eliminating classification yards. The situation is serious and unless more coal is soon secured some plants in the Pittsburgh district that are now running light will have to close down entirely. The railroad situation in the Pittsburgh and other districts has become so bad that a meeing of railroad operating vice-presidents was held in Washington, Monday, Nov. 26, to try to work out a plan for pooling the supply of cars. The whole matter was put up to a committee to establish offices in Pittsburgh, and the committee will sit continuously until the traffic problem brought about by the abnormal war business in the eastern territory has been settled. Another meeting of this committee will be held in Pittsburgh to-morrow. It is said a controller will be appointed for Government traffic on the railroads and that private routing must be abolished. The railroad situation is the most serious ever known and seems to be steadily getting worse. The Pennsylvania Railroad has declared an embargo on all freight originating on all lines east of Pittsburgh and also on all freight originating on conecting lines destined for points on or by way of the Western Pennsylvania division. Shipments are being held up in every direction and the car movement is the slowest ever known. There is a lack of cars, motive power and men to handle the enormous freight that is confronting the railroads. General conditions in the iron and steel trades showed no important developments in the past week. The amount of business being placed with the mills is relatively small, mainly for the reason that most mills are sold up for some months and have little or no material to offer for early delivery. Regular Government prices are being quoted on all lines of steel products, but reasonably prompt deliveries are very hard to obtain.

Pig Iron.—The famine in the supply of Bessemer and basic pig iron is getting worse, and large steel companies are scouring the market everywhere trying to find iron, but are not getting it. The next move to relieve the situation will likely be the cutting off of shipments of pig iron to steel plants that are not working strictly on war materials. Several such plants are named that are making automobile parts, car couplings and other products which are not necessary for the prosecution of the war. Owing to the shortage of the supply of coke, due to the congested railroad conditions, blast furnaces are running light, and are not making more than 75 to 80 per cent of their regular output. Sales of pig iron in the past week have been

very few for the reason that the iron cannot be had. We note a sale of 1000 tons of Bessemer iron for prompt shipment at the official price of $37.25, Pittsburgh, and also a sale of 1500 tons of No. 2 foundry iron for first half delivery at $33, Valley furnace. The Pennsylvania Railroad has closed with a central Pennsylvania furnace for about 11,800 tons of various grades of foundry iron for delivery at its shops at Altoona, Pa., all at regular Government prices. The outlook is that a number of furnaces in the Pittsburgh and Valley districts will soon have to bank on account of shortage of supply of coke.

We quote as follows: Basic pig iron, $33; Bessemer, $36.30; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable Bessemer, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—New inquiry for billets and sheet bars is heavier than for some months. Owing to the banking of so many blast furnaces, output of steel by the mills has been cut down very materially, and some of the larger steel producers are combing the market trying to find ingots or billets to help out. All the steel mills are in the same condition, and instead of having any steel to sell would be eager buyers if the steel could be found. Some tin plate mills have made provisional contracts for their supply of sheet bars for first half of next year.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—As yet, consumers of ferrosilicon and silvery iron are not showing much disposition to buy for next year, there being no incentive to do so, as a full supply seems assured and at regular prices recently fixed by the general committee of the American Iron and Steel Institute. The price of 80 per cent domestic ferromanganese is about $250 per ton, delivered, but a few sales have been made at slightly lower figures. We quote 80 per cent domestic ferromanganese at $245 to $250, delivered, and 18 to 22 per cent spiegeleisen at $60 to $65. A sale of 1200 to 1500 tons for delivery over 1918 is reported at $60, delivered. We quote 50 per cent ferrosilicon for prompt shipment at $150 to $155, and on contracts about $140 or higher, depending on quantity.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent $55, 11 per cent $58.30, 12 per cent $61.60, 13 per cent $64.90, 14 per cent $68.20, 15 per cent $71.50, and 16 per cent $75. We quote 6 per cent silvery iron $40, 7 per cent $42, 8 per cent $44.50, 9 per cent $47, 10 per cent $50, 11 per cent $53, and 12 per cent $56. These new prices on Bessemer ferrosilicon show reductions over former prices, ranging from $35 to over $60 per ton. On silvery iron the new prices show reductions over former prices of $35 to $40 per ton. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—Nearly all the new work being given out is being placed by the Government. The McClintic-Marshall Co. has taken 1500 tons for a plate and angle shop for the American International Shipbuilding Corporation, Hog Island, Philadelphia, and the same company is said to have taken another Government order for about 2000 tons. The American Bridge Co. has taken 2100 tons of steel shapes for the hangars and buildings to be constructed at the Langley aviation field. Second bids have been asked for the steel for the new buildings to be erected by the Kelly-Springfield Tire Co. at its proposed new plant at Cumberland, Md., which require about 1000 tons. This may possibly be awarded this week. We quote beams and channels up to 15 in. at 3c. at mill.

Steel Rails.—So far no important sales of light rails have been made at the new Government prices at 3c. per pound on 25-lb. and heavier sections. It is said that rerolling mills are now quoting light rails at higher prices than new rails rolled from billets. We quote light rails, 25-lb. and heavier, at 3c. per lb.; 16-lb. and 20-lb., 3.45c.; 12-lb. and 14-lb., 3.90c., and 8-lb. and 10-lb. at 4.35c. for full carload lots, f.o.b. Pittsburgh; for less than carload lots, down to and including five gross tons, 0.045c. extra, and small lots under five gross tons, 0.09c. extra, all per lb., f.o.b. Pittsburgh.

Plates.—There is a very heavy new demand for plates for prompt shipment, but mills are sold so far ahead that it is very difficult to place orders and secure even reasonably prompt delivery. The Government is getting to be a heavier buyer of plates right along, and the quantity available for domestic consumers is getting steadily less. On Government orders for cars mills are making fairly prompt deliveries on plates and shapes, but on orders for other cars, deliveries are only about 50 per cent of normal. We quote ¼-in. and heavier sheared plates at 3.25c. Pittsburgh.

Sheets.—The Government demand for sheets is still very heavy, orders coming out nearly every day. Last week the sub-committee on sheet steel distributed among the mills Government orders for 20,000 tons of 3/16-in. blue annealed No. 7 gage, and since has distributed 5000 to 6000 tons of Bessemer black and galvanized to go to France and Italy. The general demand is also heavy, and the American Sheet & Tin Plate Co. and other leading sheet mills have under contract practically their entire output of blue annealed and black sheets for first half of next year, and galvanized for first quarter. However, the demand for sheets from the automobile builders has fallen off very rapidly, and this will likely release a large quantity to other consumers that were intended for automobiles. Large sheet mills will take care of jobbers to the best of their ability after contracts with manufacturing consumers have been finished. The shortage in supply of steel and coal is cutting down output of sheets at nearly all the mills to some extent. Reports that the Government will issue orders cutting off entirely the building of pleasure cars is not credited, but the output may be reduced by Government orders to about 40 per cent of normal. It is not believed there will be any change in prices of sheets by the Government on Jan. 1, but at the same time it is still felt that the price of 6.25c. on galvanized is low. Detailed prices on sheets are given on page 1323.

Tin Plate.—Practically the entire output of the tin plate mills for the first half of next year is under contract. While none of the mills so far has taken contracts for tin plate except for manufacturing consumers, it is likely they will later take care of jobbers where the jobbers' orders are from manufacturers or for goods essential to the prosecution of the war. Consumers are well aware that there will be a shortage in tin plate this year, and many are trying to increase their contract over last year, but the mills are allotting to most consumers no more tin plate than they bought last year, and in some cases less. The Government is still a heavy buyer of tin plate for its own use, and also considerable for shipment to France and Italy. Some makers of tin plate will probably not be able to turn out as much next year as this year, as their allottment of steel has been cut down. There are still some export inquiries from countries other than our Allies, but little attention is paid to them, as it is not likely the Government would issue a license for such shipments. Small sales from stock are being made at the regular Government price. We quote coke plate at $7.75 per base box, f.o.b. Pittsburgh, for Bessemer or open hearth stock. Prices on terne plate are given on page 1323.

Iron and Steel Bars.—The several local makers of iron bars are now quoting the Government price of 3.50c., but say they have no bars to sell for delivery this year, and very few for the first quarter of next year. The new demand for both iron and steel bars is heavy, many consumers having held off placing orders until the Government prices came out, and now find their stock low and badly in need of replenishing. Consumers who want to buy iron and steel bars for prompt shipment say they cannot find mills that will quote for prompt delivery. The Government continues to be a heavy buyer of steel bars. We quote steel bars at 2.90c. and refined iron bars at 3.50c. in carloads, f.o.b. mills, Pittsburgh.

Muck Bar.—We quote ordinary grades of muck bar made from all pig iron at $75 to $80 per gross ton, f.o.b. Pittsburgh. We quote standard grade low phosphorus melting bars, running 0.015 in phosphorus, $95 to $100, and No. 1 standard grade, running 0.012 in phosphorus, $105 to $110 per gross ton.

Wire Rods.—Mills report a very active export and domestic inquiry for wire rods, and their output is well sold up for the next two or three months, or longer.

One local maker has practically retired as a seller of rods, preferring to put the steel into other products, on which there is a larger margin of profit. Consumers are having trouble in getting deliveries of rods as fast as needed. Prices on rods are given in detail on page 1323.

Wire Products.—One leading local maker of wire and wire nails has practically retired from the market as a seller, having all the obligations on its books it cares to take. The prices of $3.50 on wire nails and $3.25 on plain annealed wire, the mills say, are not attractive. Where they can, they prefer to put the steel into other products. Small drawers of wire say that to pay $57 for rods and sell plain wire at $3.25 and wire nails at $3.50 leaves practically no profit. The Government is a fairly heavy buyer of wire nails, and there is also an active export demand. On nails and wire for export, much higher than the Government prices can be obtained, but there is often trouble in getting a Government license to make export shipment. Prices on wire and wire nails being quoted by all the mills are given on page 1323.

Nuts and Bolts.—All the local makers of nuts and bolts will quote the new Government discounts, but say they are sold up for the next two to three months and are unable to take orders for delivery this year. The Government prices on these products given out two weeks ago are regarded as fair by all makers and consumers, but the trouble is a good many makers of nuts and bolts are running on old contracts for steel bars at prices considerably higher than 2.90c., which makes the margin of profit on the finished product very small. The new discounts are given on page 1323.

Rivets.—All the makers are now quoting the regular Government prices, $2.65 on structural rivets and $4.75 on cone-head boiler rivets. In addition, all the rivet makers that are members of the Institute of Bolt, Nut and Rivet Makers have revised their contracts to the basis of Government prices, so that all material now being shipped out is billed at the official price. The new demand for rivets is quiet, but the Government is a fairly heavy buyer on direct orders. We now quote structural rivets at $4.65 and cone-head boiler rivets at $4.75 base, in carloads f.o.b Pittsburgh.

Hoops and Bands.—There have been very few sales of bands at the Government price of 2.90c. or on hoops at the 3.50c. prices. Mills making these products are sold up for some months ahead and have no material to spare for early delivery. We now quote steel bands at 2.90c., extras as per the steel bar card, and steel hoops at 3.50c. f.o.b. mill Pittsburgh.

Shafting.—Makers report that the new demand for shafting from the automobile and screw stock machine trade has fallen off over 50 per cent, and this is releasing a good deal of shafting for consumers making other products. The demand for small sizes has been dull for some time, and some makers of shafting are seeking new orders for sizes up to 2-in., but on the larger sizes running up to 5-in. most makers are sold ahead for four or five months. The Government is still a heavy buyer of shafting on direct and indirect orders and it is said is taking 35 to 40 per cent of the entire output. We quote cold rolled shafting in large lots at 17 per cent of list, f.o.b. Pittsburgh.

Cold Rolled Strip Steel.—All makers are now quoting the new Government price of $4.50 on hot rolled and $6.50 per 100 lb. on cold rolled strip steel. Some makers made a readjustment from the former price of 9c. to a 7c. basis, but this did not apply to consumers working on Government contracts unless they in turn made a reduction in their prices on Government work. The prices on hot and cold rolled strip steel are regarded as fair, and the new extras printed on page 1270 of THE IRON AGE of Nov. 22 were those submitted by the manufacturers to the War Industries Board, and were adopted. These discounts have really been in effect since Oct. 26.

We quote cold rolled strip steel at $6.50 and hot rolled at $4.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent off for cash in 10 days, when sold in quantities of 200 lb. or more.

Railroad Spikes and Track Bolts.—The new demand for railroad spikes is quiet, but the Government demand for boat spikes is heavy, several leading makers stating that practically their entire output is being shipped to the various boat yards on Government orders. We quote standard sizes of railroad spikes at 4.50c., small spikes 6c. to 6.25c. and boat spikes 5.25c., all per 100 lb., f.o.b. Pittsburgh.

Wrought Pipe.—Mills report a fair amount of new domestic business in small lots, but they could book a very much larger quantity of pipe if they were in position to make deliveries wanted by consumers, which they are not. Most mills are sold up on both iron and steel pipe anywhere from six months to a year, and the obligations of the National Tube Co. are such that its output is practically sold over all of 1918, and over first part of 1919. The Government is still buying moderate quantities of steel pipe, which the mills are turning out and shipping promptly. The amount of line pipe used this year in gas and oil projects was much less than last year, due to the fact that the mills were filled up so far ahead on merchant pipe they were not in position to take on any large contracts for gas or oil lines and make the delivery. Discounts on iron and steel pipe now being quoted by all the mills, which are very firm, and with no pipe available for delivery this year excepting a few sizes in butt-weld pipe, are given on page 1323.

Boiler Tubes.—The Government has been a very heavy buyer of both iron and steel tubes for equipment of the boats being built now all over the country. One leading maker reports its entire output of steel boiler and seamless tubes sold up for the next 18 months. Other makers of iron tubes say they have none to sell for delivery before late next year. The discounts recently fixed by the Government on iron and steel tubes are now being quoted by any mills that are in position to take on orders for delivery this year or early next year. These discounts are given on page 1323.

Coke.—Last week the car supply averaged only 40 to 45 per cent, and efforts of coke producers and consumers with the railroads to get more cars have been without success. This is holding down output, as many plants have closed ovens, waiting to get cars. There is no incentive for consumers to place contracts for furnace or foundry coke for 1918 delivery, and nothing is being done. There is still a strong feeling that either the price of coal will have to be advanced or coke reduced, as the differential in price between coal and coke is too great. The chances favor a reduction in the price of coke. Sales of both furnace and foundry coke for prompt delivery are being made at regular prices, but the amount of coke available for quick shipment is very small. Blast furnaces in the Valleys and several in the Pittsburgh district are banked, being unable to get coke fast enough. Many by-product coke ovens are also down, being unable to get coal. The supply of labor is much better than it has been for some time. Many men who formerly had outdoor positions are going to work in the mines and at the ovens to be away from the cold weather. Another thing that is helping the labor situation is that many coke workers bought Liberty bonds and they are working steadier since doing so, to earn money to pay for them. We quote furnace coke at $6, foundry at $7 and crushed coke over 1-in. size $7.30, all in net tons of 2000 lb., at oven. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville region for the week ending Nov. 17 as 306,240 tons, a decrease from the previous week of 9568 tons. This is the smallest output of coke in the two regions for some months.

Old Material.—The local scrap trade is looking very much better from the standpoint of the new demand, which is heavier than for a long time, while prices on nearly all grades of scrap used for open-hearth purposes are up from $2 to $3 per ton. The famine in supply of pig iron is compelling many steel mills to use more scrap in their mixtures, and this is creating a heavier demand. The supply of available scrap is short, and dealers seem somewhat indifferent about making sales. They claim they cannot buy heavy steel scrap much below $30, and as they must sell it at that Government price, their margin of profit does not pay for the trouble they have in getting cars, looking after the shipment and carrying the account on their books. Sev-

eral leading scrap brokers say they would be just as well off, if it were not for their desire to keep their organizations intact, to close their offices for the next three or four months, and take a good vacation. The trouble in getting cars is getting worse and they are disgusted at the treatment they are receiving from the railroads. Even when the war order number is given, railroads often refuse to furnish cars, and dealers have to go back several times, and then do not get the order. The Carnegie Steel Co. bought last week upward of 15,000 tons of heavy steel scrap for delivery to Munhall, and the Sharon Steel Hoop Co. bought 7000 to 8000 tons, all this at the official $30 per ton. There has been an advance, in re-rolling rails, heavy steel scrap, low phos melting scrap and in all grades of sheet scrap. Last week re-rolling rails sold here as low as $34 and $35, but yesterday a sale of 1000 tons was made at $38 delivered, netting about $37.50 to the seller. Local scrap dealers deny reports that they have tried to sell scrap at higher than the Government prices.

Rerolling rails should have been quoted $34 to $35 last week. Dealers quote for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$29.00 to $30.00
No. 1 foundry cast	27.00 to 28.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	36.00 to 37.00
Hydraulic compressed sheet scrap	24.00 to 25.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mill, Pittsburgh district	22.00 to 23.00
Bundled sheet stamping scrap	20.00 to 22.00
No. 1 railroad malleable stock	26.00 to 27.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock	39.00 to 40.00
Iron car axles	42.00 to 43.00
Steel car axles	43.00 to 44.00
Locomotive axles, steel	50.00 to 51.00
No. 1 busheling scrap	24.00 to 25.00
Machine shop turnings	18.00 to 19.00
Cast-iron wheels	32.00 to 33.00
Rolled steel wheels	34.00 to 35.00
*Sheet bar crop ends	34.00 to 35.00
Cast-iron borings	18.00 to 19.00
No. 1 railroad wrought scrap	35.00 to 36.00
Heavy steel axle turnings	23.00 to 24.00
Heavy breakable cast scrap	24.00 to 25.00

*Shipping point.

Chicago

CHICAGO, Nov. 26.

Governmental demands are steadily absorbing mill capacity at a rate that augurs ill for those engaged in non-essential manufacture. Already one local independent mill is setting aside 70 per cent of its ingot production for war needs, and the tide shows no abatement. Examples of the business which is filling the mills are 8800 and 1000 tons of plates and shapes for the Submarine Boat Corporation, 5100 tons of the same materials for the American Shipbuilding Co. and 4000 tons of blue annealed sheets. Meanwhile one or two Eastern mills are making reasonably prompt deliveries of plates, shapes and bars at the fixed prices. One mill accepted 2000 tons of hard steel reinforcing bars for the first half, out of 10,000 tons offered, and another producer has also been taking bar business. Sheets are extremely active, both for export and domestic use. The base price fixed for light rails—$60 per net ton—is regarded as liberal. Fear that a shortage greater than now exists may come in pig iron has caused consumers to buy actively for first-half delivery and some few consumers are looking ahead to the last half. A sale of 20,000 tons of basic is reported for first-half delivery. Some charcoal iron, the makers of which fear they may not have enough to supply their regular customers, has been sold for last-half delivery at the Government price. Old material has been more active, and here again a shortage threatens, it being feared that the demand will be greater than the supply. One result is that prices are higher in many directions.

Pig Iron.—Consumers of pig iron have been buying actively as a result of their fear that there may be a shortage of iron. Some heavy purchases have been made for delivery in the first half of 1918, and in one instance a melter wants 1000 tons for delivery in the last half. Last-half inquiry, however, is the exception. A Kewanee foundry has closed for at least 4400 tons, and there have been many sales of lots running 1000 tons and smaller. A Central Illinois consumer recently closed for 20,000 tons of basic, first half delivery. The producers have not much iron to offer for delivery this year, although a little is being sold. A Southern producer can place a limited amount, analyzing 2.25 and over silicon; and small lots running 1.75 to 2.25 silicon have been placed for prompt delivery. The Northern furnaces have no prompt iron to offer. One unusual source of demand is from furnaces which are behind in their production and would buy iron to apply against their commitments, standard Bessemer and basic being in special demand for this purpose. It appears that need may arise for some readjustment of the commission which furnaces are paying for the sale of their iron, the selling agents being of the opinion that their services are not sufficiently compensated. With the makers of charcoal iron the demand is as active as ever, and they are turning business away every day. One maker is doubtful as to his ability to meet the demands of his regular trade up to July 1, 1918. He has had inquiries for last half, and another has made several sales into that period at existing Government prices. Meanwhile production is about normal, and shipments are heavy. In all grades of iron Government prices prevail. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	32.00
Southern coke No. 1 foundry and 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable Bessemer	33.50
Basic	33.00
Low-phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys.—Despite some reports to the contrary $250 appears to be the minimum for 80 per cent ferromanganese, that being the price quoted by the leading sellers. Considerable business has been done in the Ohio district. Bessemer ferrosilicon, 10 to 12 per cent, is very scarce, and the outlook is for a greater scarcity owing to the probability that another Jackson County furnace will have to be blown out. The official prices are $55 for 10 per cent; $58.30 for 11 per cent, and $61.60 for 12 per cent, all furnace.

Plates.—Fairly prompt deliveries are being made by an Eastern producer at 3.25c., mill, it being understood that the buyer pays the freight to consuming point, but Western makers are not yet factors in the market. Meanwhile the Government is steadily placing business with local mills. One requirement of the Government which will be supplied by the leading independent calls for 8800 tons of material, chiefly plates for the Submarine Boat Corporation, which also placed Saturday last an order with the same company for 1000 tons of plates and shapes which are wanted in a hurry. The same maker will supply 5100 tons of plates and shapes to the American Shipbuilding Co., delivery at Cleveland, to be completed by next March. Orders of this kind, coming one after the other, make it dubious how the industrial consumer will fare.

For material out of warehouse the quotation is 4.45c.

Structural Material.—Beyond occasional sales by an Eastern producer at 3c. very little is stirring in shapes except for Government purposes, as noted in the foregoing plate paragraph. The producers have little to sell, not only because of their commitments and the demand of the Government, but also because considerable of their capacity is diverted to the manufacture of shell steel. Only one structural letting is reported this week—430 tons for a Chicago school building to the Duffin Iron Co. The Union Pacific has placed some cars, including 1000 gondolas, with the Pullman Co. An Eastern maker received an order also. The Govern-

ment is buying small cars for trench use in France, but these take very little steel.

For material out of warehouse the quotation is 4.20c.

Bars.—This product is not nearly so much in demand for war purposes as are plates and shapes. Both mild and hard steel bars have been sold in the past week on the basis of 2.90c., Pittsburgh, principally by Eastern makers. One mill booked 2000 tons of concrete reinforcing bars for first half delivery, and could have taken 10,000 tons just as easily, but mill conditions stood in the way. With the Western makers, rail-carbon bars are quiescent, pending the fixing of an official price. Recent sales were made close to 3.50c., Chicago. Common iron bars are held at the Government maximum of 3.50c., Chicago.

We quote warehouse prices for Chicago delivery as follows: Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c.; base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Sheets.—The demand for sheets at the Government prices recently fixed has assumed immense proportions, coming from the Government, domestic consumers and exporters. The Government alloted 4000 tons of blue annealed sheets last Saturday. Government mill prices follow: No. 28 black sheets 5c.; No. 10 blue annealed, 4.25c., and No. 28 galvanized, 6.25c., all Pittsburgh base.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c.; and No. 28 galvanized, 7.70c.

Cast-Iron Pipe.—Winnipeg, Man., will Dec. 3 take bids a second time on the 4500 tons for which it made inquiry several weeks ago, but did not buy for the reason that prices exceeded estimates. Quotations are unchanged.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $58.50; 6-in. and larger, $55.50, with $1 extra for Class A water pipe and gas pipe.

Old Material.—The demand has been active, some interests asserting that it is larger than the supply, and statements that a real scarcity of scrap is approaching are general. The leading interest bought another lot of melting steel, paying $28, instead of $29 as it did in the last two purchases. A considerable quantity of busheling also has been purchased. Speculative operations of scrap brokers are greatly curtailed by limiting prices, and it has been suggested that they be compensated on a commission basis, but this has yet to be worked out, if it comes at all. A list of the Rock Island is being closed to-day, and the trade also has under consideration one from the C., B & Q. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$36.50 to $37.50
Relaying rails	50.00 to 55.00
Old carwheels	30.00 to 31.00
Old steel rails, rerolling	35.00 to 36.00
Old steel rails, less than 3 ft.	33.50 to 34.50
Heavy melting steel scrap	28.00 to 29.00
Frogs, switches and guards, cut apart	28.00 to 29.00
Shoveling steel	27.00 to 28.00
Steel axle turnings	22.00 to 23.00

Per Net Ton	
Iron angles and splice bars	$36.00 to $37.00
Iron arch bars and transoms	37.00 to 38.00
Steel angle bars	26.00 to 27.00
Iron car axles	45.00 to 46.00
Steel car axles	41.00 to 42.00
No. 1 railroad wrought	31.00 to 31.25
No. 2 railroad wrought	28.50 to 29.50
Cut forge	28.50 to 29.00
Pipes and flues	22.00 to 23.00
No. 1 busheling	23.00 to 24.00
No. 2 busheling	16.50 to 17.00
Steel knuckles and couplers	31.00 to 32.00
Coil springs	37.50 to 38.50
No. 1 boilers, cut to sheets and rings	19.00 to 20.00
Boiler punchings	31.50 to 32.50
Locomotive tires, smooth	33.00 to 34.00
Machine-shop turnings	16.00 to 17.00
Cast borings	16.00 to 17.00
No. 1 cast scrap	23.50 to 24.50
Stove plate and light cast scrap	18.00 to 19.00
Grate bars	17.00 to 18.00
Brake shoes	19.50 to 21.00
Railroad malleable	27.00 to 28.00
Agricultural malleable	23.25 to 24.25
Country mixed scrap	18.00 to 19.00

Bolts and Nuts.—Specifications are heavy and there has been much contracting for delivery next year on the part of the railroads, aggricultural implement makers and others. The Submarine Boat Corporation wants 1500 tons of rivets for 1918. For prices and freight rates see finished iron and steel, Pittsburgh, page 1323. Store prices are as yet unchanged. They follow:

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to ⅞ x 6 in., 40-2½; larger sizes, 30-5; hot pressed nuts, square, $2, and hexagon $2 off per 100 lb.; lag screws, 50 per cent off.

Wire Products.—Business is good at the recently established Government levels. We quote as follows per 100 lb. to jobbers:

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Rails and Track Supplies.—Inquiries for track fastenings have been more active. The prices officially fixed for light rails, the base being 3c. per pound, or $60 per net ton, for 25 to 45 lb. in carload lots, are regarded as liberal. We quote:

Standard railroad spikes, 4.50c. to 5c., base; small spikes, 4.75c. to 5.50c., base; track bolts with square nuts, 5.50c. to 6c., all in carloads, Chicago; tie plates, $70 to $80 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, $38; base (nominal); open hearth, $40 (nominal). For prices of light rails see finished iron and steel, Pittsburgh, page 1323.

Buffalo

BUFFALO, Nov. 26.

Pig Iron.—Demand is heavy and exceeds production. All classes of consumers are trying to buy, and inquiry is coming in from users in other districts outside of territory naturally tributary to Buffalo district furnaces, endeavoring to secure placement here. Melters everywhere appear to be seeking new sources of supply because their regular sources have been subjected to curtailed output on account of restricted fuel resources. One of the large producers of the district reports taking on 9000 tons of No. 2 plain and malleable for second and third quarter delivery, to go to old customers exclusively, but the sales of other producers are much smaller in the aggregate. One furnace interest was able to accommodate only old customer trade to the extent of 1000 tons out of urgent inquiry for over 5000 tons from that class of buyers. In addition it had large inquiry from other users who had never before approached it for placement of orders. Inability to obtain early delivery of coke has handicapped furnacemen very seriously, and it is understood that six furnaces tributary to this market are out of blast because of coke shortage. Foundry coke, however, is reported as a little easier as regards delivery. All sales made are at Government prices. We continue to quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry	$34.50
No. 2 X	33.50
No. 3 foundry	32.50
Gray forge	32.00
Malleable	33.50
Basic	33.00
Lake Superior charcoal, f.o.b. Buffalo	39.75

Finished Iron and Steel.—Sales agencies report a good deal of inquiry is coming in for all classes of finished products, both from domestic and Canadian sources; but that they are still unable to take on very much tonnage, aside from war material. Demand for wire products has been heavy, with considerable placed for galvanized and barbed wire in Canada. Consumers of tin plate in this territory and in Canada have placed contracts for the first six months of 1918, mills having opened their books for a tonnage equal to the amount that they had supplied during the first six months of 1917. The Donner Steel Co. of this city has its new 14-in. merchant mill nearly ready to put into operation, and it is expected it will be started up about Dec. 1.

Old Material.—Large inquiry is reported for all commodities in scrap materials, and a tendency toward a hardening of prices is noted in consequence; particularly for heavy melting steel, of which there appears to be a growing scarcity, steel turnings, cast borings, old car wheels and No. 1 railroad cast scrap. As a sequence to the heavy demand for and growing scarcity of heavy melting steel, other grades of scrap steel, such as heavy axle turnings, hydraulic com-

pressed No. 1 busheling scrap, etc., are coming more prominently into the market, with an upward trend in price. The increasing demand for heavy melting steel and allied commodities is attributable to a considerable extent to the efforts being put forth by dealers who have old contracts which must be completed prior to Jan. 1 to secure and ship necessary unfilled tonnages before that date. Shipments are still very much impeded by the gondola car stringency. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$29.00 to $30.00
Low phosphorus	36.00 to 38.00
No. 1 railroad wrought	34.00 to 35.00
No. 1 railroad and machinery cast	27.00 to 28.00
Iron axles	45.00
Steel axles	45.00
Carwheels	30.00 to 31.00
Railroad malleable	28.00 to 29.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	25.00 to 26.00
Clean cast borings	19.00 to 20.00
Iron rails	37.00 to 38.00
Locomotive grate bars	20.00 to 21.00
Stove plate	20.00 to 21.00
Wrought pipe	26.00 to 27.00
No. 1 busheling scrap	25.00 to 26.00
No. 2 busheling scrap	17.00 to 18.00
Bundled sheet stamping scrap	19.00 to 20.00

Cincinnati

CINCINNATI, Nov. 27.—(*By Wire.*)

Pig Iron.—Basic iron is in good demand. A St. Louis firm purchased approximately 20,000 tons for first half shipment, about 25 per cent of this iron to be shipped by a Southern producer and the remainder from Chicago territory. A Southern Ohio mill is asking for prices on 10,000 tons for shipment over the next 90 days, and is expected to close a contract before the end of the week, if the iron can be located. Foundry iron for first half shipment is wanted by a large number of melters, and sales are easily made when the iron can be found. There was never before as much difficulty in formulating mixtures due to the scarcity of No. 2 foundry and the substitution of No. 3. There is a shortage of high silicon iron for nearby shipment. Only one furnace in the Virginia field is now selling any iron in this territory. There is a much better supply in the South, if off grades are taken into consideration, but even this available iron is growing scarcer. Since the Government's price adjustments went into effect, melters are no longer concerned about quotations, but are worried about finding the kind of iron wanted and at a point taking the best freight rate. Local melters have bought Southern foundry iron in medium sized lots, and stocks on hand will not likely run low enough during the coming months to cause any shutdowns, but the uncertain coke supply may bring about this action on the part of more than one foundry operator. Southern Ohio foundry iron is practically unobtainable for any shipment, and the Ohio silvery irons occupy the same place. All furnaces in that district are behind in shipments on their old contracts. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, prices as follows:

Southern coke, No. 2 foundry and 2 soft	$35.90
Southern Ohio coke, No. 2	34.26
Basic, Northern	34.26

(*By Mail*)

Finished Material.—Information as to the jobbers' prices has now reached the trade, and orders are coming in again at a satisfactory rate. A prominent wholesale house is authority for the statement that, while orders are smaller than usual, the number received is surprisingly large for this time of the year. Practically no special line is affected, and there is a general demand for all kinds of finished material. The new schedule on twisted steel bars in now fully understood and is considered a very fair one by the sellers, as the differential in price between the smaller and larger sizes has been fixed and conforms with costs. We quote plain steel and iron bars at 4.08c. and twisted steel bars as follows: ¾ x 1¼-in., 4.23c.; ⅝-in., 4.33c.; ½-in., 4.43c.; ⅜-in., 4.63c., and ¼-in., 4.88c. Structural shapes are hard to obtain, and the jobbers' price is 4.18c.; plates ¼-in. and heavier, 4.43c.; cold rolled shafting from stock is 10 per cent above list, and No. 10 blue annealed sheets is quoted at 5.45c. We quote flat-head rivets at 5.50c. and cone-head rivets at 5.60c. The nearby rolling mills quote sheets as follows: No. 10 blue annealed, 4.18½c.; No. 28 black, 5.18½c., and No. 28 galvanized, 6.43½c., all f.o.b. Cincinnati or Newport, Ky. The jobbers' price on nails has stiffened somewhat, and they are now quoted at $4.10 to $4.20 per keg base.

Coke.—Quite a large number of contracts for foundry coke have been made for first half shipment and also some for the last half of next year. Practically all of this coke is bought from Connellsville producers, with the exception of a few sales that are still being made by Wise County operators. The Government's price of $7 per net ton at oven rules in all cases, and late contracts made do not carry any proviso for readjustment later on. Furnace coke is not being sold, as the supply is very limited. Shipments of both furnace and foundry coke show little improvement, due to the short car supply.

Old Material.—Shipments to Pittsburgh territory represent a hard problem to solve. On account of the freight congestion there, permits have to be obtained, and as a consequence of the red tape necessary comparatively few shipments are going forward. Under these conditions, dealers are slow in adding to their stocks, and this has also tended to hold prices on certain grades of scrap down to the present figures named, as dealers claim they are depending largely on the demand from nearby customers whose relative consumption of scrap is limited. The following are dealers' prices f.o.b. cars, southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	$17.50 to $18.00
Old iron rails	32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	33.00 to 33.50
Heavy melting steel scrap	25.00 to 25.50
Steel rails for melting	24.50 to 25.00
Old carwheels	27.00 to 27.50

Per Net Ton

No. 1 railroad wrought	$29.00 to $29.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	18.50 to 19.00
No. 1 machinery cast	24.50 to 25.00
Burnt scrap	13.00 to 13.50
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pipes and flues	15.50 to 16.00
Malleable cast	19.50 to 20.00
Railroad tank and sheet	14.50 to 15.00

Philadelphia

PHILADELPHIA, Nov. 27.

Pig iron sales offices in Philadelphia were fairly beseiged this week with inquiries, mostly by telephone, for iron. There were many demands for prompt shipment iron, but contracts were made well into next year as well. A number of orders for third quarter delivery were accepted. The largest inquiry in the market was from the National Enameling & Stamping Co., St. Louis, which had been unable to satisfy its need of 25,000 tons of basic in other markets, and had come here. An eastern Pennsylvania structural mill also sent out an inquiry for 5000 tons of basic iron for April-May delivery. While inquiry for steel-making iron was the most insistent, there was also a very active demand from foundrymen. Consumers all seem to have realized at the same time that a shortage of pig iron is certain. Unless a remedy is soon found for the difficulties which handicap furnace production and shipments, it is expected that the country will experience this winter the worst pig iron shortage it has ever known. Little is being done in finished steel aside from Government orders. Bar iron producers have revised contracts so that unfilled tonnages will be delivered at the new price of 3.50c., Pittsburgh. The old material market is still upset as a result of price fixing.

Pig Iron.—There is scarcely a blast furnace in this district that has been working at full capacity during this month, and producers and consumers alike have come to a realization that there will be a most serious shortage of pig iron throughout the winter unless a remedy is speedily found for the troublesome coke situation. Railroad embargoes are also complicating mat-

ters. Southern furnaces have been under an embargo for several days and are far behind on contracts. There is also an embargo on Virginia railroads which prevents shipments of iron except to consumers who have war contracts. Congestion of freight is yet another factor in the iron shortage, as shipments are on the road a much longer time than under more normal conditions. With these conditions preventing production and delivery of iron, consumers have been caught short and have come into the market for a sufficient supply to help them out. Sales offices here have sold every available ton of iron, and in a number of instances have been notified by the furnaces to make no further commitments for nearby delivery. Manufacturers who have war contracts are clamoring for iron and are insisting that the Government assist them in getting it. Some of these consumers had not contracted for iron ahead, but had depended on Washington to obtain a supply for them when it was needed. This adds to the troubles of furnaces in making deliveries on contracts, and the consumer with iron contracted for frequently does not get each month's quota on schedule because of the interference of priority orders. Pig iron men here are discussing the possibility of the Government assuming more drastic control over pig iron to insure a full supply to all concerns engaged on war work. Such Government control would undoubtedly mean pooling of orders and the distribution of priority orders to furnaces regardless of the contracts already on their books. Some believe that the pig iron trade will be permitted to work out the situation without such Government control, but they admit that the deliveries to consumers who have no war contracts must suffer delays and possible curtailment. A factor which has disturbed pig iron producers is the tendency of consumers to use a Government order number to obtain more iron than is really needed on the Government work. Steps are being taken so that such priority shipments will cover only the iron actually needed on the Government job, with no surplus for the consumer's civilian work. Word has reached here that the Canadian Government has established an embargo on shipment of pig iron except to British possessions. This will probably interfere with shipments of low phosphorus iron to the United States. Several cars were held up at the border when the order was issued, but were later released. A permit system, similar to that in this country, will probably be adopted. One of the large inquiries for iron this week was for 25,000 tons of basic wanted by the National Enameling & Stamping Co., St. Louis. An eastern Pennsylvania structural mill inquired for 5000 tons of basic for April-May delivery. There were a number of other large inquiries in the market, many of which will not be satisfied. The American Bridge Co. and the Alan Wood Iron & Steel Co. were looking for more basic iron. All of the subsidiaries of the United States Steel Corporation are in great need of iron. Selling this week has included several contracts for delivery in the third quarter of 1918. We quote the following standard grades at furnace, the freight to destination to be added:

Eastern Pennsylvania No. 1 X	$34.50
Eastern Pennsylvania No. 2 X	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X	33.50
Virginia No. 2 foundry	33.00
Basic	33.00
Gray forge	32.00
Bessemer	36.30
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Coke.—Shipments of coke show no improvement despite efforts of the Fuel Administration to remedy the situation. Blast furnaces are working at only partial capacity and the quality of the coke is such that a great deal of off iron is being produced. Coke contracts for next year are being freely made by two leading Eastern sellers, but only customers who have been on their books in the past are receiving consideration. It is said here that efforts of the Fuel Administration to solve the coke problem by the pooling of orders will not be successful, if attempted, because of the varying requirements of iron producers. Under such an arrangement, it is pointed out, furnaces would not be assured of obtaining the grade of coke they must have to produce standard grades of iron. Spot coke is not to be had. One sales office here reports that it has not sold a carload of coke in two months.

Ferroalloys.—There is a better inquiry for ferromanganese. The nominal quotation is $250 per ton for any delivery, but this is being shaded, in some instances as low as $240 having been quoted on good sized orders. There is an inquiry in the market for 600 tons, and a leading seller said that this would probably be placed at a price somewhere between $240 and $250. A report that a large tonnage was sold at $225 to the Government probably arose from the fact that a producer, from patriotic motives, put in a bid at that price, but the bid was received too late and the Government order was placed at $249. Two large contracts for the Central West are said to have been placed in this market recently. An Eastern steel company has sent out an inquiry for 5000 tons of 10, 11 and 12 per cent ferrosilicon for delivery throughout 1918. Spiegeleisen is weaker and is now being freely quoted at $60, furnace.

Billets and Slabs.—The Bethlehem Steel Co. has sent out an inquiry for a large tonnage of slabs for its Sparrows Point, Md., 110-in. plate mill, which was recently placed in operation. The company has no slab mill and has been using ingots for rolling plates ½ in. and thicker. The slabs are required for plates of ¼ to ½ in. The demand for billets and slabs is active. Discarded forging billets have been sold by steel companies in a number of instances at the fixed price for rerolling billets, $47.50, Pittsburgh.

Sheet Bars.—Production of merchant sheet bars has been decreased, owing to the fact that a number of companies are using their sheet bar rolls for rolling shell bars. Some of the sheet manufacturers have been so crowded with shell bar contracts that they have not rolled sufficient quantities of sheet bars for their own use. The Bethlehem Steel Co. came into the market a few days ago for 5000 tons of sheet bars. It is difficult to find mills with sheet bars to offer.

Sheets.—Since the fixing of prices for sheets, there has been an active demand. A leading Ohio manufacturer has sold almost up to its capacity for first quarter. A few producers are said to be accepting orders for second quarter. We quote No. 10 blue annealed at 4.25c., Pittsburgh; No. 28 black at 5c. and No. 28 galvanized at 6.25c.

Structural Material.—Structural mills continue to receive liberal specifications from the Government for merchant ships. There is very little building inquiry in the market aside from Government work. Regardless of the ability of mills to accept their orders, builders probably feel that their chances of obtaining deliveries, in view of the gradual elimination of all non-Government work from the railroads, would be doubtful. Among the Government projects for which bids have been submitted by fabricators are three buildings at the Washington Navy Yard, totaling about 1200 tons, and eight buildings at the Hog Island shipyard of the American International Shipbuilding Corporation, totaling about 2000 tons. The Pennsylvania Railroad requires 200 tons for a bridge and 300 tons for a roundhouse in Philadelphia. We quote shapes from mill at 3c., Pittsburgh, and from warehouse at 4.185c., Philadelphia.

Plates.—Eastern plate producers are greatly disturbed over the action of the Government in placing orders for shipment of ship plates to the West, with Chicago as a basing point instead of Pittsburgh. A large Eastern mill refused to accept a Government order for 1500 tons on this basis, but from patriotic motives reversed its decision and will ship the material. Some of the plate producers say that at the price-fixing conferences in Washington they did not agree to accept Chicago as a basing point. Manufacturers of plates here contend that if Chicago is to be accepted as a basing point, the Government should place its Western orders with mills in the Chicago district. The question of the propriety of plate mills exacting a charge of 50c. per 100 lb. for plates for

prompt delivery, as has been done in this market, has been discussed in Washington. A large Eastern producer, which has been selling plates on this basis, defends the practice, maintaining that such a charge is as legitimate under the agreed schedule of prices as it is for a mill to own its warehouse and charge the recognized warehouse extras. Most of the mills in this district have sold some plates from stock recently, and in nearly all cases a charge for service has been made. In some instances this extra has been $10 per ton. An Eastern Pennsylvania mill, which had a limited tonnage of universal plates for early delivery, has sold all that it cares to take and has withdrawn from the market. Sheared plates for non-Government work are to be obtained only from one or two mills in this district. We quote mill prices on plates at 3.25c., Pittsburgh, and from warehouse 4.435c., Philadelphia.

Iron and Steel Bars.—At the meeting held in New York recently to discuss fixed prices on bar iron no definite decision was reached as to whether the 3.50c. price should be f.o.b. mill or f.o.b. Pittsburgh, according to bar iron sellers here. In the announcement issued by the committee of the American Iron and Steel Institute this phrase was used: "Usual and customary extras for size, quantity, etc., and established custom as regards delivery points to govern." The established custom of bar iron mills in Eastern Pennsylvania is to sell f.o.b. mill when competing with mills in the Pittsburgh district, but on business in the Philadelphia or New York districts the usual custom has been to sell on a Pittsburgh base. Whatever the intention of the committee, the mills have construed the price-fixing agreement as giving them the right to sell on a Pittsburgh base at all times, and this custom now generally prevails. The bar iron makers have in most cases revised prices of unfilled tonnages on all contracts to the 3.50c. base. The same has been done on bolts and rivets. New demand for bar iron and its allied products continues active, the shipbuilding industry absorbing a large part of present mill output. The American International Shipbuilding Corporation has been distributing large orders for bolts for its new shop buildings. The situation as to steel bars remains practically unchanged. Most of the mills are not taking on new business in soft steel bars, though one mill has sold fairly good lots of high carbon bars in this district. This demand for concrete reinforcing bars continues active. We quote bar iron at 3.685 c., Philadelphia, and steel bars at 2.90c., Pittsburgh.

Old Material.—The old material market is in somewhat of a turmoil owing to conditions growing out of the fixing of prices by the Government on four major classifications. A growing certainty is that jobbers and brokers must be content with smaller profits than they have been accustomed to make. Large producers of scrap will undoubtedly be more inclined to sell direct in order to realize the highest possible price for their material, while even the small dealers show an inclination to hold out for prices within such close range of the fixed maximums that very little margin is left for the jobber or broker. Steel mills have not shown a disposition to pay the top prices which some sellers are asking, and as a result scrap is not moving as freely as might be expected in view of the great scarcity of pig iron. As the highest prices are obtainable in the Pittsburgh district, local dealers prefer to sell there, and the offers which nearby Pennsylvania mills have made are not attracting large tonnages. The congested condition of railroad transportation adds to the difficulties of trading. In the past week there has been an embargo on shipments into Pittsburgh, due to the congestion of terminals there. This may be lifted at any time, but will undoubtedly be renewed whenever traffic bcomes too great for the railroads to handle, as may now happen frequently. A few violations of the fixed price agreement are unofficially reported. A bar iron mill is said to have been called to task for paying more than the $35 price for No. 1 railroad wrought, and a certain railroad is accused of accepting more than the fixed price for some of its scrap. Some of the violations, however, are "within the law;" that is, they are not technically violations, but the effect is the same. As a dealer remarked, "There are many ways to 'beat the game' if one wants to do so." The iron and steel scrap committee of the American Iron and Steel Institute and the American Board of Scrap Dealers are keeping a close watch on the situation, and it is said that persistent violations will be dangerous for the violators. We quote for delivery at consuming points in the Philadelphia district as follows:

No. 1 heavy melting steel	$27.00 to $28.00
Steel rails, rerolling	38.00 to 40.00
Low phosphorus heavy melting	36.00 to 38.00
Old iron rails	38.00 to 40.00
Old carwheels	33.00 to 35.00
No. 1 railroad wrought	35.00
No. 1 yard wrought	32.00 to 32.50
No. 1 forge fire	22.00 to 23.00
Bundled sheets	22.00 to 23.00
No. 2 busheling	15.50 to 16.50
Steel turnings (for blast furnace use)	15.50 to 16.50
Machine shop turnings (for rolling mill use)	18.00 to 19.00
Cast borings (for blast furnace use)	15.50 to 16.00
Cast borings (clean)	20.00
No. 1 cast	31.00 to 33.00
Grate bars	21.50 to 22.50
Stove plate	22.00 to 23.00
Railroad malleable	30.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications)	30.00 to 32.50

British Steel Market

Price Readjustments Unsettle Pig-Iron Market—Tin Plates Firmer

(*By Cable*)

LONDON, ENGLAND, Nov. 28.

The pig-iron market is unsettled pending official adjustment of prices. The stringency in hematite iron continues. Quotations on American wire rods are widely divergent, from £24 upward c.i.f. having been asked, but the business reported has been at lower figures, presumably on cheap government freight. Tin plates are firmer at 31s., including tin allowance. Ferromanganese is quiet. We quote as follows:

Tin plates, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s.
Ferromanganese, £45 nominal.
Ferrosilicon, 50 per cent, c.i.f., £35 upward.
On other products control prices are as quoted in THE IRON AGE of July 19, p. 171.

St. Louis

ST. LOUIS, Nov. 26.

Pig Iron.—Inquiries for pig iron continue to multiply in this market, but the inability of producers to meet demands continues, though there was some relieving of the strain during the past week by a few of the furnaces represented in St. Louis. This applied chiefly to second quarter requirements and considerable tonnage was booked, among them one for 2000 tons of No. 2 Southern foundry and one of 1000 tons of No. 2 Northern foundry. There were also some sales of No. 3 Southern. Quite a considerable number of small orders for No. 2 Southern ranging downward from 200 tons to carload lots were placed and accepted, the aggregate for the market being about 5000 tons. Inquiries now outstanding include one for 2000 tons of malleable, one for 1500 tons of malleable and one for 12,000 tons of northern basic. The situation seems to be improving and readjusting itself to the Governmental needs and while the prices are fixed the activity over placing of orders is becoming more brisk as furnaces find that they can squeeze in a little more business for specific datings. A very large tonnage, however, remains unplaced, as consumers needs cannot be met by the furnaces.

Coke.—Greater activity in coke was reported during the week with a considerable number of sales in tonnages ranging from 600 tons downward. Inquiries for about 5000 tons are still in the market unfilled owing to conditions prevailing at the ovens. No representatives of ovens are taking any new business, their orders being to confine themselves to old customers until these are all taken care of to the best of the ability of the

producers. By-product coke continues out of the market.

Finished Iron and Steel.—In finished products, light rails are reported slightly easier at 3c. mill base and deliveries are reported better, with the result that business is being sought. Announcement is also made that about two-thirds of the standard section steel rail contracts which it was sought to be turned over from Bessemer to open-hearth with an addition to the price have been amended to meet the situation in order to assure to the buyers deliveries at earlier periods than otherwise would have been possible. The added sum is $2 per ton. In other finished products, no consideration beyond the regular routine is being shown customers except those having government orders and in this division stove companies having contracts for field kitchens are getting needed material promptly. Movement out of warehouse continues up to capacity and for stock out of warehouse we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material.—In scrap material, conditions have measurably readjusted themselves to the Government's fixed prices, though the complete settling down of the trade has not yet been accomplished. Dealers are still endeavoring to get their contracts into the clear and are doing some trading among themselves, but there is no buying of moment being done by consumers, save in one instance in which one of the heaviest consumers in this market has closed for its needs for 90 days under prices based on the Government figures but allowing for variations from the Government specifications. Consumers' yards generally are low in scrap iron supplies, but purchasing agents are out of the market awaiting a completion of the readjustments under way as a result of the Government's action. One list came out during the week, 600 tons from the St. Joseph and Grand Island, mostly rails. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district as follows:

Per Gross Ton

Old iron rails	$35.00 to $35.50
Old steel rails, re-rolling	36.00 to 37.00
Old steel rails, less than 3 feet	37.00 to 37.50
Relaying rails, standard section, subject to inspection	60.00 to 75.00
Old carwheels	28.50 to 29.00
No. 1 railroad heavy melting steel scrap	27.00 to 27.50
Heavy shoveling steel	26.00 to 26.50
Ordinary shoveling steel	25.00 to 25.50
Frogs, switches and guards cut apart	28.00 to 28.50
Ordinary bundled sheet scrap	19.00 to 19.50
Heavy axle and tire turnings	19.00 to 19.50

Per Net Ton

Iron angle bars	$34.50 to $35.00
Steel angle bars	27.00 to 27.50
Iron car axles	43.50 to 44.00
Steel car axles	41.00 to 41.50
Wrought arc bars and transoms	42.00 to 42.50
No. 1 railroad wrought	31.00 to 31.50
No. 2 railroad wrought	29.50 to 30.00
Railroad springs	32.50 to 33.00
Steel couplers and knuckles	29.50 to 30.00
Locomotive tires, 42 in. and over, smooth inside	31.50 to 32.00
No. 1 dealers' forge	21.75 to 22.25
Cast iron borings	15.50 to 16.00
No. 1 busheling	23.00 to 23.50
No. 1 boilers, cut to sheets and rings	20.00 to 20.50
No. 1 railroad cast scrap	23.50 to 24.00
Stove plate and light cast scrap	17.00 to 17.50
Railroad malleable	25.50 to 26.00
Agricultural malleable	21.50 to 22.00
Pipes and flues	21.00 to 21.50
Heavy railroad sheet and tank scrap	19.50 to 20.00
Railroad grate bars	18.00 to 18.50
Machine shop turnings	16.00 to 16.50
Country mixed scrap	18.50 to 19.00
Uncut mixed railroad scrap	21.00 to 21.50

Cleveland

CLEVELAND, Nov. 27.

Iron Ore.—It is expected that ore prices prevailing this year, which were approved by the Government at the time of the first price agreement late in September, will not be changed next season with the exception of a possible slight advance to cover any increase in the costs of mining operations and transportation. In the past few months the cost per ton has increased 22½c., of which 10c. is for labor, 8c. for rail haul from the mines, and 4.50c. for war tax on freight charges. Some reservations of special grades of ore have already been made for next season. Shipments have continued heavy until the past day or two, but now cold weather is causing a slackening in the movement. The supply of boats is plentiful. Lake shipments will be kept up well into December or as long as weather conditions permit. It is expected that sufficient ore will be brought down to cover the minimum requirements of practically all the consumers. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Pig Iron.—The demand for pig iron has increased and the market is very active in both foundry and basic grades. The danger of an acute shortage, particularly in foundry iron, is growing more serious. Most of the sellers in this territory have booked about all the tonnage they dare to take on for the first half in view of the coal and coke shortage and the danger of a curtailment of their production. Some blast furnace plants are barely securing sufficient fuel to keep them running. Sellers are trying to supply their regular customers, but many consumers have not placed contracts for the first half and are having great trouble in finding furnaces that are willing to take their orders. In steel making iron a Northern Ohio consumer that recently bought about 5000 tons of basic for the second quarter secured about 5000 tons additional iron during the week and still wants 10,000 tons more for the same delivery. A Southern Ohio consumer is inquiring for 10,000 tons and a Valley interest for 3000 to 5000 tons, both of these inquiries being for December-January delivery. One leading Cleveland interest has no more basic iron to offer during the first half. Foundry iron inquiries range from small lots up to 2000 tons. The Government is inquiring for 600 tons in addition to 3300 tons placed last week for a Hamilton plant for the Emergency Fleet Corporation. The situation is doubtless aggravated somewhat by the fact that the higher prices for Southern iron have practically shut that iron out of the Ohio market, as consumers are unwilling to pay approximately $4 a ton more for Southern iron than for Northern. There is considerable inquiry for high silicon iron which is also very scarce for first half delivery. A Youngstown steel plant is in the market for 1000 tons per month of 9 to 10 per cent silvery iron for delivery through the entire year. We quote delivered Cleveland, as follows:

Bessemer	$37.25
Basic	33.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phos., Valley furnace	50.00

Coke.—There is a great deal of inquiry for foundry coke and considerable business was placed during the week in contracts for the first half and entire year. Many consumers are having a great deal of trouble in securing a supply of coke and as a result sellers are receiving frequent inquiries from consumers whom they have not previously supplied. Owing to the scarcity, some foundries having Government contracts may find it necessary to appeal to the Government to secure them enough coke to keep their plants running. We quote coke at $6 per net ton at oven for furnace and $7 for foundry, standard Connellsville makes.

Finished Iron and Steel.—Consumers are inquiring for steel for their regular requirements outside of Government work for the first half and first quarter, and some of the mills are trying to take care of their regular trade as far as they can, subject to Government requirements. One independent mill is taking steel bar specifications for the first quarter, and another will take contracts for bars, plates and structural material for the first half and nails and wire for the first quarter. New inquiry for steel for Government work continues heavy. The thirty-six 3500-ton boats placed by the Emergency Fleet Corporation with the American Shipbuilding Co. will require approximately 50,000 tons of plates and structural material. These boats will be 251 ft. long, and the contract provides for their delivery during the year 1918. A Canton manufacturer is in-

quiring for 1200 tons of Bessemer bars for truck axle work. The automobile industry, as far as pleasure car production is concerned, continues to slow down, and this is indicated by a sharp falling off in specifications. Some automobile manufacturers are asking a suspension of deliveries on their contracts. One mill will probably consent to suspensions for a limited period. Some of the bolt, nut and rivet makers who have revised old contracts to meet the new Government prices are asking for readjustment of their steel contracts, but are not meeting with success. The demand for plates continues heavy, but mills that have been getting higher than the Government prices are finding it more difficult to make sales at their maximum price of 5c. There is a great deal of inquiry for sheet bar contracts for the first quarter. One quotation on slabs has been made at considerably higher than the Government price. Sheets continue in heavy demand, and at least one Valley producer is entirely sold up for first quarter. New requirements from the Government are also heavy. We quote sheets out of Cleveland warehouse at 5.35c. for No. 10 blue annealed, 6.35c. for No. 28 black and 7.60c. for galvanized. Jobbers are now taking orders, f.o.b. Cleveland warehouse, for shipments outside of Cleveland. This means that the price from Pittsburgh to Cleveland is added to the selling price. There is still some irregularity in warehouse prices for the Cleveland trade. We quote as minimum warehouse prices: Steel bars, 4c.; plates, 4.35c., and structural material, 4.10c., but jobbers are authorized under the Government regulations to quote 3½c. per 100 lb. higher than the above prices, and some are making the higher quotations. Mill extras except as to quantity differentials apply. Prices on hard steel bars continue to ease off, and the general quotation now is 3.25c. at mill.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved now that Government prices have been fixed. Implement manufacturers, railroads, and jobbers are in the market. Contracts are being taken from consumers for the first half and from jobbers for the first quarter. Rivet manufacturers are covering their customers with first half contracts. In some cases old contracts for bolts, nuts and rivets have been readjusted at the Government prices. We quote rivets at 4.65c., Pittsburgh, for structural, and 4.75c. for boiler rivets.

Old Material.—There is a fair amount of trading between dealers, some of whom still have considerable high-priced tonnage due on old contracts and wish to complete shipments before Jan. 1 to avoid cancellations. The activity is almost wholly in heavy melting steel, borings and turnings. Prices are practically the same as a week ago. Dealers are paying $28.50 to $29 for heavy melting steel and are asking the Government price of $30 from the mills, but none of the latter are in the market. Sales of borings are reported at $19 gross delivered to outside mills. Owing to the fact that the Government has named maximum gross prices on such grades as are being regulated, trading in the Cleveland market on borings, turnings and railroad wrought, which has generally been on a net ton basis, is now being mostly done on a gross ton basis and quotations below have been changed to correspond with the practice. Cleveland scrap dealers have organized a division of the American Board of Scrap Iron Dealers, which will handle such matters as transportation, rejections and other problems, and have named A. Bialosky as temporary president. A permanent organization will be effected at a meeting this evening. We quote, f.o.b., Cleveland, as follows:

Per Gross Ton

Steel rails	$26.00 to $27.00
Steel rails, rerolling	36.00 to 37.00
Steel rails, under 3 ft.	30.00 to 31.00
Iron rails	35.00 to 36.00
Steel car axles	45.00 to 46.00
Heavy melting steel	28.00 to 29.00
Cast borings	18.00 to 18.40
Iron and steel turnings and drillings	18.25 to 18.75
No. 1 railroad wrought	34.00 to 35.00

Per Net Ton

Iron car axles	$44.00 to $45.00
No. 1 busheling	22.00 to 23.00
No. 1 cast	23.00 to 23.50
Railroad grate bars	17.25 to 17.75
Stove plate	17.25 to 17.75

New York

NEW YORK, Nov. 27.

Pig Iron.—Very fair activity has characterized the pig iron market during the past week. The demand has in fact been considerably stronger than the supply, and in some cases, notably that of a railroad which was trying to buy from a Virginia company, from which it had bought for years, necessary tonnage to cover requirements was not obtainable. A Buffalo steel company which sold freely for a week or so is now out of the market for the first half of next year and is so seriously embarrassed by coke shortage that it may not be able to keep up with its deliveries of pig iron. The fuel shortage is serious and numerous furnaces will carry over into the new year large tonnages which should be delivered this year. The delay in delivery is due almost entirely to coke shortage, although there has been some trouble in getting cars. The new rail and water rate of $5.75 on pig iron from Birmingham to New York became effective Nov. 25, being an advance of $1.50 over the rate of $4.25 which had prevailed. This advance has not excited much interest for the reason that no boats are obtainable except when specially chartered, and pig iron shippers are depending almost entirely on all-rail shipments, on which the rate from Birmingham to New York is $6.15. The rate to Boston is $6.40, all rail, and $6 rail and water. Some Southern furnaces whose iron analyzes 2.25 to 2.75 silicon for No. 2 foundry are quoting $33.50 furnace, as they are entitled to do, for the iron is equal to No. 2X, according to the nomenclature in vogue in the East. Others, however, continue to quote $33 straight. For early delivery we quote as follows, tidewater:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 Plain	33.75
No. 2 Southern (rail and water)	38.75 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.00 to 37.25

Ferroalloys.—The domestic ferromanganese market is fairly firm and active at $240 to $245, delivered. There have been sales of 100-ton and carload lots for prompt delivery which have aggregated a fair volume in the past week. There is very little contracting for next year thus far, consumers apparently buying what they need as they need it. The report last week of a sale of 750 tons to the Government at $225 delivered is unconfirmed, it being generally understood that the original sale at $249 stood. The spiegeleisen market is also active with inquiries from various sources and for different deliveries amounting to 3500 to 4000 tons. The quotation for the 20 per cent grade is from $57 to $60 per ton, furnace, for delivery this year or first quarter. There have been no large sales. The market for 50 per cent ferrosilicon is strong at $140 to $150 per ton for delivery next year and $160 to $175 is the range for prompt and December.

Finished Iron and Steel.—No great volume of business is moving. Plates are sold at the fixed price to domestic consumers, but for indirect Government use, such as apparatus for plants on Government work. The mills as a whole are finding no great pressure for the sheared material. The volume of fabricated steel work in November will hardly equal the total for October. Bar iron producers are holding that the fixed price of 3.50c. is on a Pittsburgh basis and not a general mill price. Considerable contracting for the first quarter of 1918 has been done on this basis. Bar iron manufacturers are still complaining that the price is too low, and the case of one mill may be noted which is refusing to sell at the new price, planning instead, if it cannot get business at its own price, 4c. and over, to quit rolling the sizes involved. The feeling in these circles is that with the large spread between steel bars and iron bars, steel bars have also got to be advanced and, of course, along with them plates and shapes. Reports continue that steel is delivered in advance of needs at shipyards, but ultimately it is believed that storage of material to a greater or less extent will be necessary to provide for the especially high rate of shipbuilding likely to occur in the latter part of 1918—a rate prob-

ably larger than the plate producing rate. Railroad terminal congestion is interfering seriously with the receipt of materials and the shipping of finished factory products. Meanwhile, railroad equipment buying is of no larger proportions, nor is anything expected from this quarter in the near future. A large new fabricated steel job, likely to be closed soon, covers 6000 tons for the E. W. Bliss Co., Brooklyn. Some foundry extensions at the Washington Navy Yard, on which bids have been taken, involve 1600 tons. At Lake Denmark 10 buildings for the Government will take 425 tons. The New York State Barge Canal is to provide a pier terminal at Coenties Slip, New York, taking 450 tons, and an addition for the Eighth Coast Artillery Armory, New York, calls for 300 tons. Some miscellaneous bridge work, including steel castings, for the Pennsylvania Railroad, totals 270 tons. Of contracts awarded mention may be made of 1900 tons for a plate and angle shop at the Hog Island shipyard, to the McClintic-Marshall Co.; 950 tons for eight buildings at Hog Island to the Belmont Iron Works; 475 tons for the New York Central at Tonawanda, to the Phoenix Bridge Co., and 1000 tons, in addition to similar work for export, for an airplane storage building, Brooklyn, to the Samuel Austin Co. Some railroad bridge work has also been closed, including 250 tons for the Chesapeake & Ohio, and 450 tons for two bridges for the New York Central. It appears that the buildings at Langley Field, requiring some 2000 tons and given to the American Bridge Co. and Lewis F. Shoemaker & Co., are not to be built. The only sizable railroad car purchases noted are 1000 gondolas for the Union Pacific, awarded to the Cambria Steel Co., and 1000 hopper cars for the same road to the Pullman Co. We quote mill shipments of steel bars at 3.095c., New York; shapes 3.195c., plates 3.445c. and bar iron, the price established last week, at 3.695c., New York. Out of store prices are 1c. higher and to all must be added 3 per cent of the freight charge or about 20c. per 100 lb. for the transportation tax.

Old Material.—Much dissatisfaction continues to prevail in the scrap market, especially on the part of brokers, who say that dealers are asking within 50c. of the price at which brokers must sell material on which the Government has fixed prices. Brokers declare they cannot carry on business on this basis. As a result very little is being done on heavy melting steel, No. 1 railroad wrought and borings and turnings. There have been no further developments in regard to price fixing and the attitude of the Government is uncertain. There is fair demand for machinery cast and prices on it are somewhat higher. We quote prices of brokers as follows to New York producers and dealers, per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania)	$24.00 to $24.50
Old steel rails (short lengths) or equivalent heavy steel scrap	24.00 to 25.00
Relaying rails	45.00 to 50.00
Rerolling rails	35.00 to 36.00
Iron and steel car axles	41.00 to 42.00
No. 1 railroad wrought	32.00 to 33.00
Wrought-iron track scrap	27.00 to 28.00
No. 1 yard wrought long	27.00 to 28.00
Light iron	7.00 to 8.00
Cast borings (clean)	16.00 to 17.00
Machine-shop turnings	14.00 to 15.00
Mixed borings and turnings	13.00 to 14.00
Wrought-iron pipe (1 in. minimum diameter), not under 2 ft. long	25.00 to 26.00

Dealers in New York City and Brooklyn are quoting as follows to local foundries, per gross ton, but for delivery to cupola platforms of Brooklyn foundries about $3 more is quoted:

No. 1 machinery cast	$26.00 to $27.00
No. 1 heavy cast (column, building materials, etc.)	21.00 to 22.00
No. 2 cast (radiators, cast boilers, etc.)	21.00 to 22.00
Stove plate	19.00 to 20.00
Locomotive grate bars	16.00 to 17.00
Malleable cast (railroad)	27.00 to 28.00
Old carwheels	27.00 to 28.00

Cast-Iron Pipe.—No action has yet been taken by the Government in regard to the 2000 tons of pipe for shipment to France, on which bids were recently received. There is much uncertainty as to the attitude of the Government in regard to prices and this is causing a feeling of hesitancy in the market. New York quotations continue at $56.50 for 6-in. and heavier and $59.50 for 4-in.

IRON AND INDUSTRIAL STOCKS

Better Feeling on Wall Street—Numerous Advances Recorded

NEW YORK, Nov. 28.

A distinctly better tone prevailed in the stock market last week and advances all along the line were recorded, especially in leading iron and steel shares. This change in feeling was generally attributed to the growing conviction on the part of the public that stocks are too low, regardless of how long the war may be prolonged and what temporary reverses may come. The announcement of a radical change in policy in regard to railroads has not yet caused any excitement on the Stock Exchange, although no one can figure what the effect on earnings will be. The general disposition is to credit the railroad men and Government officials with a spirit of fairness in dividing earnings equitably.

Baldwin Locomotive was one of the very few stocks recording losses last week. It declined 1⅞ points, while among the shares which recorded gains were the following: American Can, com., 3½; American Car & Foundry, pref., 4⅞; American Locomotive, com., 3; American Steel Foundries, 3⅛; Bethlehem Steel, 2⅛; Bethlehem Steel, class B, 2⅝; Colorado Fuel & Iron, 3½; Crucible Steel, com., 3; General Electric 1¼; Gulf States Steel, 5¾; Lackawanna Steel, 7¾; Midvale Steel, 1½; National Acme, 1; Nova Scotia Steel & Coal, 15; Pressed Steel Car, com., 4½; Republic Iron & Steel, com., 8⅛; Sloss-Sheffield, 4¼; Superior Steel, 4; U. S. Cast Iron Pipe & Foundry, com., 1⅞; U. S. Steel, com., 5; U. S. Steel, pref., 2.

The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalm. com.	18 - 19¼	Int. Har. Corp. com.	53 - 54¾
Allis-Chalm. pf.	72	Int. Har. Corp. pf.	97¼
Am. Can com.	34½ - 37¾	Lack. Steel.	76¾ - 82⅛
Am. Can pf.	93 - 96½	Lake Sup. Corp.	11 - 12⅜
Am. Car & Fdry. com.	63⅜ - 66¾	Midvale Steel	43½ - 45⅛
Am. Loco. com.	54 - 56	Nat.-Acme.	26½
Am. Rad. com.	260	Nat. En. & Stm. com.	36¾ - 38¾
Am. Rad. pf.	133	N. Y. Air Brake.	110 - 114
Am. Ship com.	88 - 92	Nova Scotia St.	62⅞ - 66
Am. Ship pf.	87⅝ - 89½	Pressed St. com.	56 - 56¾
Am. Steel Fdries.	55 - 58	Pressed St. pf.	94
Bald. Loco. com.	54 - 58⅝	Ry. Steel Spring com.	40½ - 45
Beth. Steel com.	81⅝ - 83¼	Republic com.	72⅞ - 80⅜
Beth. St., Cl. B.	80⅞ - 83⅞	Republic pf.	94 - 95½
Case (J. I.) pf.	78	Sloss com.	36½ - 39½
Cent. Fdry. com.	24½ - 31½	Superior Steel.	33⅝ - 38⅜
Cent. Fdry. pf.	36 - 43	Transue-Wms.	39
Chic. Pneu. Tool.	47 - 49	Un. Alloy Steel.	36¾ - 37¾
Colo. Fuel	33½ - 36½	U. S. Pipe com.	11⅝ - 12½
Crucible St. com.	55⅛ - 57⅞	U. S. Pipe pf.	47 - 47½
Crucible St. pf.	88	U. S. Steel com.	95⅝ - 99⅛
Deere & Co. pf.	95 - 96	U. S. Steel pf.	108¾ - 111
Gen. Electric	128 - 134½	Va. I. C. & Coke.	50½ - 52½
Gt. No. Ore. Cert.	25½ - 28⅛	Warwick	8½ - 8⅝
Gulf States Steel.	86¼ - 89	Westingh. Elec.	38⅝ - 39⅞
Int. Har. of N. J. com.	105½ - 108½		

Industrial Finances

The Republic Rubber Co., Youngstown, Ohio, will very shortly issue $3,000,000 more of preferred stock. Payments for the stock subscribed for must be made on or before March 1, 1918.

The Lewis Foundry & Machine Co., Groveton, near Pittsburgh, manufacturer of machinery and parts, has increased its capital from $200,000 to $1,000,000.

The National Steel Products Co., Birmingham, Ala., has increased its capital from $33,340 to $80,340.

For several years, the affairs of the Carter Iron Co., formerly operating a puddling plant at Paden City, W. Va., and the Monongahela Iron & Steel Co., operating a puddling and bar iron plant at Hays Station, near Pittsburgh, were in the hands of receivers. This receivership has been terminated, and a new company organized, known as the Vulcan Iron & Steel Co., which is now operating the plant at Paden City, which contains 24 puddling furnaces and other equipment for the manufacture of low phosphorus melting bar, the capacity, when running full, being 750 to 1000 tons per month. This product is sold largely to makers of high speed and tool steels. The plant of the Monongahela Iron & Steel Co., at Hays Station, continues to be operated under that name, and contains 14 puddling

furnaces and other equipment, the output being muck bar, low phosphorus melting bar, and stay-holt iron, also a limited quantity of wrought iron chain, the capacity of the plant on all these products being about 500 tons per month. The Vulcan Iron & Steel Co., and the Monongahela Iron & Steel Co. are identified interests, having general offices in the Union Bank Bldg., Pittsburgh. Robert Locke is president, and George B. Meanor, Jr., is secretary and treasurer.

Dividends

The Baldwin Locomotive Works, 3½ per cent on the preferred, payable Jan. 1.

The Bethlehem Steel Co., quarterly, 2½ per cent on the common "A" and 2½ per cent on class B, payable Jan. 2.

The J. I. Case Threshing Machine Co., quarterly, 1¾ per cent on the preferred, payable Jan. 1.

The Central Foundry Co., quarterly, 1¼ per cent on the preferred and 2 per cent on the first preferred, both payable Jan. 15.

The Lackawanna Steel Co., quarterly, 1½ per cent on the common and extra 3½ per cent, payable Dec. 31.

The Moline Plow Co., quarterly, 1¾ per cent on the first preferred, payable Dec. 1.

The National Enameling & Stamping Co., quarterly, 1¾ per cent on the preferred, payable Dec. 31.

The Railway Steel Spring Co., quarterly, 1¼ per cent on the common, payable Dec. 29, and 1¾ per cent on the preferred, payable Dec. 20.

The United States Cast Iron Pipe & Foundry Co., quarterly, 1¼ per cent on the preferred, payable March 15.

OBITUARY

LYMAN B. JEWELL, until his retirement a few months age, president of the Jewell Belting Co., Hartford, Conn., died at his home in that city Nov. 20, at the age of 90 years. He was born in Winchester, N. H., in 1827, and from 1856 to 1873 was engaged in the dry goods commission business in New York and Boston. In the latter year he became a member of the firm of P. Jewell & Sons, founded by his father, Pliny Jewell. He was treasurer of the Detroit Leather Co. and a director in the Phoenix Insurance Co., the Southern New England Telephone Co. and the American National Bank.

GRANT BARNEY SCHLEY, head of the brokerage firm of Moore & Schley, New York, died Nov. 21. Mr. Schley was a director of the American Smelting & Refining Co., the Republic Iron & Steel Co., the Pittsburgh Coal Co., the Northern Pacific Railway Co., the Electric Storage Battery Co. and other large companies. He was 73 years old and had not taken an active part in business for several years.

EMERY H. DIEHL, assistant general manager of the United Alloy Steel Corporation, Canton, Ohio, died Nov. 20 after a short illness, age 33 years. He was graduated from the Pennsylvania State College in 1906 and was connected for a time with the Carnegie Steel Co., which he left four years ago to become associated with the Canton plant.

R. B. DANGELEISEN, age 31, sales manager of the Globe Machine & Stamping Co., Cleveland, died at Saranac Lake, N. Y., Nov. 12. He entered the employ of the company in 1902 and, because of his efficiency and executive ability, was advanced rapidly and deservingly to the position which he held at the time of his death.

Fishel & Marks, Cleveland, dealers in iron and steel scrap, have purchased a two-story building opposite their scrap yard at 3013 East Fifty-fifth Street, which will be used for offices. Extensive improvements have been made in the yard, including the installation of two electro-magnet cranes, 70-ton capacity each, and several new shears. The yard has an Erie Railroad siding capable of holding 14 cars at a time.

Completed in six and one-half months, a 90-in. plate mill, which has a capacity of about 125,000 tons a year, has just been placed in operation at the South Chicago works of the Illinois Steel Co.

FABRICATORS' WAR MEETING

Permanent War Organization Empowered to Distribute Tonnage and Cover Employment Matters

PITTSBURGH, Nov. 27.—The fabricating interests of the country at a meeting held at the William Penn Hotel to-day took measures to have the industry represented by a specially appointed organization in dealings with the Government. Some 76 concerns, with about 100 individuals, representing bridge and building fabricators and also steel plate fabricators, were present. They voted approval of collective dealing as a means for getting better and quicker results in relations with the Emergency Fleet Corporation or any other Government agency which may desire to enter into negotiation. The plan is that the fabricators agree formally to the institution of the war service committee, announced in THE IRON AGE of Nov. 8, and bestow the following rights on the committee: The distribution of tonnage for given Government work, as for ships; the making of contracts in that connection; the control of employment matters, and adjustment of details of construction.

To provide for the plan, the meeting voted the establishment of a permanent war organization for the period of the war, to which it gave the name, the Steel Fabricators of the United States. C. E. Michael, president Virginia Bridge & Iron Co., Roanoke, was made permanent chairman, and Lewis D. Rights, Lewis F. Shoemaker & Co., New York, was made permanent secretary. They were made ex-officio president and secretary-treasurer, respectively of the collective dealing organization. As an executive committee of this was appointed the war service committee mentioned in THE IRON AGE of Nov. 8, together with George P. Bard, Petroleum Iron Works, Sharon, Pa., who was later added as a representative of the plate fabricators, to be supplemented by four others to be recommended by the permanent chairman. Since the meeting the permanent chairman has made the appointments as follows: Paul Willis, Kenwood Bridge Co., Chicago; William S. Simpson, Jr., Christopher & Simpson Co., St. Louis; W. A. Garrigues, Levering & Garrigues Co., New York, and E. A. Gilbert, Standard Boiler & Plate Iron Co., Niles, Ohio.

Prices of By-Product Coke in Chicago District

Never in the history of Chicago sellers of coke has buying been so heavy as at the present time. Buyers are eager to contract into next year, while prompt coke is almost impossible to find, despite the fact that some consumers are begging for it, in consequence of which representative sellers are pointing out that long ago they advised the same consumers to cover their future needs.

Quotations at Chicago for by-product coke are $8.65, ovens, for furnace coke; $9.15, ovens, for crushed coke, and $9.65 for foundry coke. In accordance with the stipulation in the Government's price announcement, quotations are now made f.o.b. producing ovens, instead of delivered at the consuming point. The freight from the Connellsville region, $2.65, is added to the official oven price, to which the consumer must add the freight to his plant.

The F. H. Linthicum Bronze Foundry, Baltimore, Md., has been formed, with F. H. Linthicum, who for the past two years has been sales manager for the American Manganese Bronze Co., Philadelphia, and for the past seven years has held positions of superintendent and assistant manager in several large foundries, as proprietor. W. C. Lilly, who will be superintendent after Dec. 1, was for four years superintendent of the Nelson Valve Co. and more recently has been superintendent for the American Manganese Bronze Co. The new company will specialize in small duplicate castings, and has capacity for castings as large as 500 lb. each.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 35.5c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c.; minimum carload, 40,000 lb. and 85c.; minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha 40c., minimum carload 46,000 lb.; to St. Paul 35.5c., minimum carload 46,000 lb.; Denver 79c., minimum carload 46,000 lb. *A 3 per cent transportation tax now applies.*

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1-in. and longer, including large-head barb roofing nails, taking an advance over this price of $2, and shorter than 1-in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire, and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets.....$4.65 base
7/16 in. x 6 in. smaller and shorter rivets.....45-10 per cent off list
Machine bolts h.p. nuts, ⅜ in. x 4 in.
Smaller and shorter, rolled threads.....50-10-5 per cent off list
Cut threads.....50-5 per cent off list
Larger and longer sizes.....40-10 per cent off list
Machine bolts, c.p.c. and t nuts, ⅜ in. x 4 in.
Smaller and shorter.....40-10 per cent off list
Larger and longer.....35-5 per cent off list
Carriage bolts, ⅜ in. x 5 in.
Smaller and shorter, rolled threads.....50-5 per cent off list
Cut threads.....40-10-5 per cent off list
Larger and longer sizes.....40 per cent off list
Lag bolts.....50-10 per cent on list
Plow bolts, Nos. 1, 2, 3.....50 per cent off list
Hot pressed nuts, sq. blank.....2.50c. per lb. off list
Hot pressed nuts, hex., blank.....2.30c. per lb. off list
Hot pressed nuts, sq., tapped.....2.30c. per lb. off list
Hot pressed nuts, hex., tapped.....2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped.....2.00c. per lb. off list
Semi-finished hex. nuts.
⅜ in. and larger.....60-10-10 per cent off list
9/16 in. and smaller.....70-5 per cent off list
Stove bolts.....70-10 per cent off list
Stove bolts.....2½ per cent extra for bulk
Tire bolts.....50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. A tentative differential of $10 per ton over soft rods for high carbon rods has been agreed upon.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. and larger, $5 to $5.50; ¾ in., 7/16 in. and ½ in., $7.00 base. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh. Track bolts with square nuts, 7c. to 7.50c. to railroads, and 8c. to 8.50c. in small lots for fairly prompt shipment.

Terne Plate

Effective Nov. 7, prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. for delivery late this year, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel

3½ to 4½ in.	34
2½ to 3¼ in.	24
2¼ in.	17½
1¾ to 2 in.	13

Charcoal Iron

3½ to 4½ in.	12½
3 to 3¼ in.	+ 5
2½ to 2¾ in.	+ 7½
2 to 2¼ in.	+22½
1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$340	1¾ in.	$220
1¼ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days.

[Open-hearth stock, $5 per ton above these prices.]

Blue Annealed—Bessemer	*Cents per lb.*
Nos. 3 to 8	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.15
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Nov.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
21	23.50*	23.50*	78.50*	6.50	6.37½	8.00	7.75
22	23.50*	23.50*	80.00*	6.50	6.37½	8.00	7.75
23	23.50*	23.50*	80.00*	6.50	6.37½	8.00	7.75
24	23.50*	23.50*	....	6.50	6.37½	8.00	7.75
26	23.50*	23.50*	80.00*	6.50	6.37½	8.00	7.75
27	23.50*	23.50*	80.00*	6.50	6.37½	8.00	7.75

*Nominal.

NEW YORK, Nov. 28.

The markets are all inactive. Copper is an absolutely controlled commodity and nominal at the Government price. Tin is unobtainable for spot delivery and is nominal at higher prices. Lead is very quiet but firm. Spelter is dull but no weaker. Antimony is a little stronger.

New York

Copper.—Sales of copper to large buyers for November-December delivery from producers at any price are practically impossible and we continue to quote the Government price of 23.50c. as nominal. The only interesting news is the official announcement that jobbers are permitted to sell copper in small lots at a 5 per cent profit above the Government price. This refers to metal bought at that price. The announcement has been variously interpreted: By some that they can sell their present stocks at a 5 per cent profit; by others that, no matter what they paid for it, it can be sold only at 23.50c. plus 5 per cent, or 24.675c. per lb. At any rate this part of the market is more active with metal in small lots selling at 27c. to 28c., New York. Under regulation by the Copper Producers' Committee sales of large lots are being made at 23.50c. for delivery in the first quarter to the general trade, with the understanding that those buying the metal for commercial needs must give it up if the Government requires it. Copper is also being delivered for prompt use at 23.50c. if the consumer has Government business. The entire situation apparently is working out satisfactorily.

Tin.—The week has been an eventful one. Official announcement was made to the trade late last week that the American Iron and Steel Institute would act for the War Industries Board so as to completely control the tin market. All imports and distribution will be regulated by this organization, in a manner similar to that now effective with the British Consul. All consignments will be made to the Institute instead of to the consul. The entire situation will, however, be under more stringent control than in the recent past. The new arrangement is not effective yet as some details are still to be worked out. It is expected it will be in working order soon. A pamphlet has been issued giving the rules to be complied with by those desiring to do business. The spot market is unrelieved with no immediate prospect of betterment. Spot tin is unobtainable with 80c. bid all this week but no sellers. Under the circumstances no business is possible. It is reported that the Government has commandeered all tin in bonded warehouses and perhaps in others. After its needs are supplied the metal remaining will be released to the owners. Arrivals to Nov. 27, inclusive, were 1310 tons, with 4100 tons reported afloat. Spot Straits in London yesterday was £284 per ton, an advance in the week of £4½.

Lead.—The market is unchanged at the price levels of last week of 6.50c., New York, and 6.37½c., St. Louis, for the outside market, with the leading producer still quoting 6.25c., New York. Demand is light, with very little business recorded. The market is a drifting one, but its tone is firm. Some import business has been done in bond at 6c., New York.

Spelter.—There has been very little change in the market in the last week. It still lacks life. Somewhat better demand is reported from the galvanizing interests, to whom some metal has been sold. The quotation is unchanged at 7.75c., St. Louis, or 8c., New York, for prime Western for early delivery or even for delivery through January. There are still a few sellers willing to shade these prices. Very little is heard of the negotiations of the new Zinc Committee with the Government or the fixing of prices.

Antimony.—The market is a little more active and higher at 14c. to 14.25c., New York, duty paid, for the brands available.

Aluminum.—There is no change and little demand. No. 1 virgin metal, 98 to 99 per cent pure, is quoted at 36c. to 38c. per lb., New York.

Old Metals.—The market is practically unchanged. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible (nominal)	23.50
Copper, heavy and wire (nominal)	23.50
Copper, light and bottoms	21.00 to 22.00
Brass, heavy	17.25 to 17.50
Brass, light	12.00 to 12.50
Heavy machine composition	23.75 to 24.00
No. 1 yellow rod brass turnings	15.00 to 15.25
No. 1 red brass or composition turnings	19.00 to 19.50
Lead, heavy	6.00
Lead, tea	4.25
Zinc	6.00

Chicago

Nov. 26.—It is understood that the prices which the Government will approve for the resale of copper by dealers are 26c. for Lake and 25.87½c. for electrolytic. It was proposed that the dealers sell at 23.50c. plus 5 per cent, but they dissented vigorously, at least one important interest declaring that it would terminate its contracts and retire from the copper business if that basis became effective. Sales have been few, but a little copper has been sold at prices ranging from 26c. to 28c. Tin is higher and exceedingly scarce. Sellers have been informed that it is to be controlled by the Government through the American Iron and Steel Institute. Lead is fairly active, but presents no features of especial interest. Spelter is weaker. Antimony is a trifle stiffer. We quote as follows: Casting, Lake and electrolytic copper, 28c.; tin, carloads, 80c.; small lots, 85c.; lead, 6.25c. to 6.50c.; spelter, 7.75c. to 8c.; sheet zinc, 19c.; antimony, 15.50c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 19c.; yellow brass, 14.50c.; lead pipe, 5c.; zinc, 5c.; pewter, No. 1, 37.50c.; tinfoil, 45c.; block tin, 50c.

St. Louis

Nov. 26.—In non-ferrous metals a condition of quietude prevailed, but prices continued firm and in some divisions higher, particularly tin. On carload lots the quotations to-day for lead and spelter were: Lead, 6.50c.; spelter, 7.87½c. to 8c. In less than carload lots the quotations were: Lead, 7c.; spelter, 8.50c.; tin, 84c.; copper, nominal; Asiatic antimony, 18c. In the Joplin district there was a further weakening of low grade ores which sold down to $55 and below, but there was no change in the top grades, which sold as high as $72.50 on 60 per cent metal analysis basis. The average for the week for the district was $57 per ton. The top price is being paid for only a very small tonnage each week, and this renders the average very low. Lead ore remained unchanged during the week with the basis sales of 80 per cent metal at $75 per ton and the average at the same figure. Calamine ranged from $32 to $37 per ton, basis of 40 per cent metal, with the average for the district for the week at $35 per ton. We quote dealers' prices on miscellaneous scrap metals, buying, as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; pewter, 25c.; tinfoil, 42c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

The annual convention of the American Institute of Chemical Engineers will be held in St. Louis Dec. 5 to 8, inclusive, and the local branch of the organization has completed plans for the entertainment of the visitors on an elaborate scale.

Pittsburgh and Nearby Districts

Recently the Standard Car Construction Co., Sharon, Pa., made a shipment in one train load of 75 tank cars. This train load left its plant late on Nov. 10, and reached St. Louis on the morning of Nov. 14, which is remarkably fast time for freight shipment for this distance, when the present congestion in railroad movement is considered.

Members of the Engineers' Society of Western Pennsylvania, Pittsburgh, recently made a trip of inspection to the plant of the American Steel & Wire Co., at Donora, Pa. The open-hearth steel plant, rod and wire mills, and also the spelter plant were inspected. In addition, a visit was made to 100 concrete houses built by the American Steel & Wire Co., at Donora for employees. There are five different designs of these single and double houses. All are fitted with gas, fireplaces, electric light, complete baths and other conveniences. It is claimed that owing to their construction, these houses are heated with 10 per cent less coal than ordinarily used. The danger of fire is almost entirely eliminated, and the cost of maintenance is reduced to a minimum.

The Manufacturers' Light & Heat Co., Pittsburgh, supplier of natural gas, has notified the Public Service Commission that after Jan. 1, it will discontinue selling gas for manufacturing purposes. Early notice is given to allow manufacturers affected by this order time to install other heating appliances.

Referring to the recent meeting of the stockholders of the Carbon Steel Co., Pittsburgh, W. D. Updegraff, who was chairman of the stockholders' committee, has issued a statement as follows:

"The meeting was entirely harmonious; every action was unanimous. President McKnight announced that he would accept no further bonuses for a period of five years, and all future bonuses to be given to other employees or officers are referred to a committee consisting of W. H. Baker, Mr. Spear and myself. The present management and policies of the company will be continued."

The Liberty Carbon Co. has been organized at Clarksburg, W. Va., with a capital of $100,000 to manufacture carbon black.

Wm. B. Scaife & Sons Co., Pittsburgh, has applied for a Pennsylvania charter with a capital of $850,000. This concern formerly operated under a New Jersey charter. No changes have been made in the personnel of the company or in its products, which consist of steel structures of all kinds, bridges, coal tipples, also welded, riveted and brazed steel tanks for all purposes.

The Federal Sales Co., Pittsburgh, has been organized with a capital of $25,000 to deal in mill and builders' supplies.

The Keystone Bronze Co., Pittsburgh, has recently bought some property adjoining its plant in that city, on which it will probably build a large addition in the near future, but definite plans have not yet been made.

The Edgewater Steel Co., Pittsburgh, works at Oakmont, Pa., has recently bought a very heavy line of iron-working tools, to be installed in its plant for the manufacture of Government forgings.

The Pittsburgh Saw & Mfg. Co., a new interest, is now occupying its new plant in that city, and is prepared to manufacture a complete line of circular metal saw blades. The officials of the company are: J. G. Ullsack, president and treasurer; Charles Greer, vice-president and assistant treasurer; G. W. Agerter, secretary, and J. A. Carothers, manager. Mr. Agerter was formerly office manager of the Hunter Saw & Machine Co., Pittsburgh, and Mr. Carothers was superintendent of the same company.

The Virginia Chain Co. has been organized at Parkersburg, Va., with a capital of $40,000 to manufacture chain.

The foundry of the Bronzbraswyte Metal Co. is located at 4909-4911 Butler Street, Pittsburgh, the office of the company being located in 611 First National Bank Building, in that city. Thomas D. Maloney is president and Joseph F. Erny, secretary and treasurer. J. F. Leever is superintendent of the foundry. The concern manufactures bronzes, brasses and special metals and has facilities for making castings up to 3000 lb. in weight. Its equipment is modern, and the company specializes in the manufacture of mill bearings according to formula, and also on special mixes. The company has been very successful and recently increased its capacity about 100 per cent.

The Sidney Tool Co., Sidney, Ohio, has awarded a contract to the Concrete Steel Construction Co., Springfield, Ohio, for a 50 x 150-ft. machine shop. The company will be in the market for some machine tools.

The Aluminum Solder Mfg. Co., New Castle, Pa., has been organized with a capital of $25,000 to manufacture aluminum solder curtain stretchers. The incorporators are Andred Knittel, Frank E. Alborn, J. V. Cunningham, all of New Castle, Pa.

The Duke Motor Co., Pittsburgh, has been organized with a capital of $500,000 to manufacture automobiles and motor vehicles of all kinds. The company plans to build a new plant in the Pittsburgh district.

The new plant of the United States Electric Steel Co., at South Connellsville, Pa., is now in successful operation. The plant is equipped with one 10-ton Grönwall-Dixon electric furnace. The company buys its power from the West Penn Power Co. This power comes over a high transmission line and is stepped down to 220 volts. The company so far has made only electric steel ingots, which are sold to the general trade, but later on expects to add a finishing mill, for rolling either billets or sheet bars, or both. The company has also made a small quantity of pig iron in its electric furnaces from scrap, using coke for recarburizing, the product being pig iron running low in sulphur and phosphorus.

The Lewis Foundry & Machine Co., manufacturer of steel works and rolling mill machinery, works at Groveton, P. & L. E. Railroad, has opened an office in room 508 Farmers Bank Bldg., Pittsburgh. W. A. Herron, is president.

The Government has requested the Pittsburgh Commercial Club to co-operate with it in the Pittsburgh district in placing work with manufacturers. Ira C. Harper, president, has requested that manufacturers communicate at once with the club at its headquarters, 609 Penn Avenue, Pittsburgh. The appeal is made to all in a position to handle Government work on small tools and lathes. The Government has notified the club that it also needs about 30,000,000 small pressed-steel cups, drawings of which are on exhibition at the club's rooms.

The Crucible Steel Co. of America, Pittsburgh, has taken an order from the British Government for 150,000 6-in. shell forgings.

Furnace Limestone Taken for Camp Roads

In commenting on some of the troubles encountered by pig iron producers, the Matthew Addy Co., Cincinnati, says: "Production should be increased, and there are ample facilities in the country to turn out much more iron than is now being made. The problem is so to co-ordinate effort as to focus effort on the moving of raw materials needed for making iron. There is apparently so little team work in this direction that one furnace has been obliged temporarily to suspend operations because an army officer, or at least an army contractor armed with the right of eminent domain, so to speak, has commandeered the limestone which was going to this furnace to be used as flux, because it was needed in making roads in a cantonment. Perhaps the roads in the cantonment were a more vital necessity than the iron, but we have our doubts. Then, at the furnaces the same iron has been ordered shipped out by Government priority agents to several different manufacturers. There is a conflict of authority which is most confusing. Of course these problems will all be worked out in time. From the looks of things it would seem that each Government agent or contractor regards the particular job on which he is engaged as the most important, and he goes ahead without regard to the needs of other Government contractors."

PERSONAL

Guy D. Leopold, purchasing agent and traffic manager Edgewater Steel Co., Pittsburgh, has been elected president of the Purchasing Agents' Association of Pittsburgh. The other officers and directors elected are:

Guy D. Leopold

First vice-president, C. T. Stewart, Harbison-Walker Refts. Co.; Second vice-president, D. E. Ferguson, H. K. Porter Co., secretary, H. E. Harmon, Pittsburgh, Des Moines Steel Co., treasurer, C. W. Forcier, Mackintosh-Hemphill Co.

Directors: Robert McMillan, Pittsburgh Steel Co., W. E. Motherall, Standard Seamless Tube Co., Davis N. Glass, Booth & Flinn, C. W. Lepper, Pittsburgh Railways Co., W. A. Forrester, Westinghouse Air Brake Co., W. A. Kober, H. J. Heinz Co., E. H. Vockrodt, Frick & Lindsay Co., F. C. Bortz, Bessemer Coal & Coke Co., J. E. Stauffer, A. M. Byers Co., A. Davia, Dravo Contracting Co. Directors of the National Association elected are: Robert F. Blair, Pittsburgh Gage & Supply Co., and E. H. Ridgway, Colonial Steel Co.

Dan Lewis, formerly employed as salesman for the Seaman-Sleeth Co., Pittsburgh, manufacturer of rolls, and who resigned to accept a position as salesman for the Standard Engineering Co., Elwood City, Pa., has returned to the employ of the Pittsburgh Rolls Corporation, successor to the Seaman-Sleeth Co., and in the same capacity as before.

Dr. Edward Ewing Pratt, until recently chief of the Bureau of Foreign and Domestic Commerce at Washington, has been elected vice-president of the Pacific Commercial Company, 11 Broadway, New York.

Fred J. Miller, who for nine years past has been general manager of the factories of the Remington Typewriter Co., has resigned.

W. L. Schaeffer, for some years in the advertising department of the National Tube Co., Frick Building, Pittsburgh, will, on Dec. 1, succeed L. F. Hamilton, who has had charge of the advertising department, and who has resigned to connect himself in the same capacity with the Walworth Mfg. Co., Boston.

Dr. Raymond F. Bacon, director of the Mellon Institute of the University of Pittsburgh, will be commissioned a lieutenant-colonel in the Ordnance Department of the Army, and will be directed to take charge of the chemical work for our armies in France.

Russell G. Caldwell, formerly sales manager of the central department of the General Fireproofing Co., Youngstown, Ohio, has been transferred to the office of the company at Washington, D. C.

Dwight Smith, Mt. Gilead, Ohio, has been appointed secretary of the Chamber of Commerce, Middletown, Ohio, succeeding J. A. Finegan, who has retired on account of ill health.

Norton A. Booz has resigned as secretary of the Machinists' Supply Co. Chicago, to become general manager of the Machinists' Supply Co., Pittsburgh. The two companies are not connected. By the departure of Mr. Booz the Chicago Machinery Club loses its secretary and one who has been an unceasing worker for the firm establishment of Chicago's new luncheon club. He formerly lived in Reading, Pa.

Louis A. Freedman has been elected secretary of the Aeronautical Society of America, succeeding Edward Durant. Mr. Freedman is a mechanical engineer and has developed machinery for the production of dry batteries.

Wallace T. Roberts, who has been sales engineer for the Sullivan Machinery Co., Chicago, in southern Michigan, northern Indiana and northern Ohio has been appointed district manager for the company in Denver, Col. He succeeds Capt. Matt R. Blish, who has been acting manager since last May, but whose duties with the Ordnance Department, United States Army, now take him away. George W. Blackinton, who was manager in Denver up to last May, is now captain commanding the third battalion, 343d Infantry, National Army, Camp Funston, Kansas. The Sullivan Machinery Co. also announces that Joseph H. Brown assistant manager of its New York office, has been appointed district sales manager in Chicago, succeeding William P. J. Dinsmoor, who resigned to engage in business in Denver.

L. F. Hamilton, for several years advertising manager National Tube Co., Pittsburgh, has resigned to become manager of sales promotion of the Walworth Mfg. Co., Boston. Mr. Hamilton takes up his new duties Dec. 1.

C. P. Perin, of Perin & Marshall, New York, who has been in India for some months in connection with new construction at the works of the Tata Iron & Steel Co., Sakchi, Bengal, will probably remain in India until some time in 1919. T. W. Tutwiler, general manager of the company will leave India for the United States early in January and plans to be in this country a considerable part of next year. In the meantime Mr. Perin will have charge of operations at Sakchi.

Frank L. Estep has resigned as chief engineer of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., and on Dec. 1 will become chief engineer of the Nova Scotia Steel & Coal Co. New Glasgow, Nova Scotia. He has been connected with the Tennessee company for the past eight years, first as assistant chief engineer, being promoted to his present position on the resignation of E. J. Best in 1912.

W. F. Trenary, Jr., has been appointed representative of the Harrison Safety Boiler Works at Birmingham, Ala., with headquarters at 419 Brown-Marx Building. He succeeds W. R. Jennison, who has terminated his connection with the company.

Bernard H. Prack will hereafter conduct under his own name the industrial architecture and engineering business of Prack & Perrine. Offices are located in the Keystone Building, Pittsburgh, and in the Lumsden Building, Toronto, Ont.

John H. Gledhill, for many years electrical engineer of the Baldwin Locomotive Works, Philadelphia, has resigned and will go into business for himself. He has been succeeded by F. W. Up de Graff.

The President has appointed Rear Admiral Frederick R. Harris, Corps of Civil Engineers, United States Navy, to succeed Rear Admiral Washington L. Capps as general manager of the Emergency Fleet Corporation. Admiral Harris has had no experience in shipbuilding, but he is an accomplished engineer who has handled many extensive projects, involving serious problems. For the past two years he has served as the chief of the Bureau of Yards and Docks and to-day is the youngest bureau chief and officer holding the rank of rear admiral in the navy, being but 40 years old. As chief of the Bureau of Yards and Docks, he is in control of all construction work of the navy on shore and the maintenance of all navy yards and naval stations.

J. H. Pardee, president, and J. P. Ripley, railway engineer, J. G. White Management Corporation, New York, are visiting the Philippine Islands, making a general inspection of the Manila Electric Railroad & Light Co. and other interests in the islands operated by the Management Corporation. They are expected to return to New York about Jan. 15.

The announcement is made by J. Frater Taylor of his intention to retire from the presidency of the Algoma Steel Corporation, Sault Ste. Marie, Ont., at the end of the present year. Mr. Taylor will still retain his association with the Soo industries in an advisory capacity as chairman of the Lake Superior Corporation. It is understood that W. C. Franz, now vice-president, will succeed Mr. Taylor as president of the Algoma Steel Corporation.

F. D. Walden has resigned as superintendent of the Giddings & Lewis Mfg. Co., Fond du Lac, Wis., manu-

facture of lathes and other tools and sawmill and woodworking equipment. Employees presented Mr. Walden a watch.

George T. Fonda, safety engineer for the Bethlehem Steel Co., Bethlehem, Pa., has been appointed director of labor and safety for all plants of the company.

D. J. Murphy, formerly associated with the New York sales offices of the American Steel & Wire Co., has resigned to become manager of sales for the West Leechburg Steel Co., Pittsburgh, in charge of New York and New England territory, with headquarters at 50 Church Street, New York.

O. P. Blake, manager of sales at St. Louis for the Inland Steel Co., Chicago, has been transferred to Washington for the purpose of facilitating co-operation by his company with the Government. An office has been opened in the Wilkins Building.

Edward F. Goltra, president of the Mississippi Valley Iron Co., St. Louis, has been made a member of the committee of the Upper Mississippi River Improvement Association, which is to determine a feasible way to rehabilitate the river traffic. Mr. Goltra's interest in the movement has been accentuated by the recent successful transportation of iron ore from Minnesota fields to his blast furnace in St. Louis.

William T. Price has resigned as manager and chief engineer of the power department of the De La Vergne Machine Co. and has established the Price Engine Corporation, with headquarters at 110 West Fortieth Street, New York, to manufacture a crude oil engine of his own design.

John L. Haines, assistant to vice-president Willis L. King of the Jones & Laughlin Steel Co., Pittsburgh, who spent the summer at Kingston, Mass., in an effort to regain his health, has returned to his residence in the East End in Pittsburgh. His health does not show the improvement expected.

C. C. McBride of Pittsburgh has been elected treasurer and assistant secretary of the West Penn Power Co., offices at Connellsville, Pa. John Young succeeds Mr. McBride as auditor.

The Non-Essential Industry Problem

WASHINGTON, Nov. 27.—Automobile manufacturers have deluged Washington officials with telegrams protesting against an order reported to have been sent out by the War Industries Board denying transportation to passenger automobiles or to materials for their manufacture. In that regard Judge Lovett, priority officer of the board, yesterday issued the following emphatic statement: "The report that I am contemplating an order shutting off cars from the automobile industry is without any foundation in fact. I said a week ago that I did not have in mind any transportation order treating any industry as non-essential, since priority order No. 2 went as far as it seemed to me wise to go in dealing with so-called non-essentials by transportation orders. That statement still stands."

At the present time the committee of automobile and accessories manufacturers is at work upon a plan for the gradual reduction of the output of passenger cars and the diversion of manufacturing facilities to the production of airplanes, engines, shells, shrapnel, etc. In the meantime the steel situation is being handled by Mr. Replogle, whose object is the conservation of alloy steel with the least possible hardship to automobile manufacturers.

The Railroad War Board has aroused renewed interest in the problem of the non-essential industries by reiterating its recommendation that transportation be denied to some 500 products which it is claimed are not essential either to the conduct of the war or to the general welfare of the public. Judge Lovett, however, adheres to his original position that no solution of the non-essential industry problem by railroad embargo is practicable. The War Industries Board supports the priority officer in this position and promises full hearings before any action is taken discriminating against any particular line of manufacture.

Mechanical Engineers' Meeting

The engineers' part in the war is to be the dominant theme of the annual meeting of the American Society of Mechanical Engineers to be held next week in New York. Under this general subject, sessions will be held on the morning and afternoon of Dec. 5, and the following addresses are announced:

Universal Public Service in Peace and War, Dr. Ira N. Hollis, president American Society of Mechanical Engineers.

The Engineering Societies in the National Defense, Gano Dunn, president J. G. White Engineering Corporation, New York.

Special Education in Time of War, Dr. Charles S. Howe, president Case School of Applied Science, Cleveland.

The Agricultural Problem, Dr. W. H. Jordan, director New York Agricultural Experiment Station, Geneva, N. Y.

The Fuel Problem, Prof. L. P. Breckenridge, Sheffield Scientific School, Yale University, New Haven, Conn.

Engineering Research, C. E. Skinner, engineer research division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Motor Transportation, William P. Kennedy, consulting engineer, New York.

Army Transportation, Major L. B. Moody, carriage division of the ordnance department, Washington, D. C.

The Aircraft Problem, Prof. W. F. Durand, chairman National Advisory Committee on Aeronautics, Washington, D. C.

The Solution of the Cantonment Construction Problem, Leonard Metcalf, consulting engineer, Boston.

Interest will center in the opening session on Tuesday evening, in the conferring of honorary membership upon Maj.-Gen. George W. Goethals and an address by Hon. William H. Taft, ex-President of the United States.

Simultaneous with the continuation of the keynote session on Wednesday afternoon will be three sessions devoted respectively to power-plant subjects; to general papers technical in character; and to codes prepared by the sub-committee on protection of industrial workers, on safety standards for elevators and woodworking machinery.

On Thursday morning the papers to be read include the following: "An Exact Volume Regulator for Blast Furnace Engines," by L. C. Loewenstein; "Expenses and Costs," by H. L. Gantt; "By-Product Coke and Coking Operations," by C. J. Ramsburg and F. W. Sperr, Jr.

At 12.30 p.m. luncheon, with an address by Prof. Dexter S. Kimball, Cornell University, on "The Relation of Industrial Management to Engineering," is announced.

In the afternoon a session will be devoted to "Inspection in Munitions Manufacture."

On Friday morning a session will be devoted to the employment of women in such industrial plants as machine shops and munition works, and the preparatory work now being undertaken for training the large numbers of crippled men who may be expected to return from the war and who will need to become efficient and self-supporting.

Plan Not Approved

At the suggestion of the Chamber of Commerce of Youngstown, Ohio, blast furnace interests held a meeting Nov. 22, to discuss the coke shortage situation growing out of congested traffic conditions in the Connellsville coke regions. After considerable discussion regarding the proposal to pool shipments of fuel to furnaces, the plan was held to be impracticable. It was pointed out that furnaces use different grades of coke and that, therefore, the pooling plan is not tenable. One suggestion being given serious consideration is a proposed extension of the present system of making up solid trains going from given originating points to given destinations. This plan has been before the traffic emergency committee of the Council of National Defense and appears to be accepted generally as one source of relief. It would be applied to coke shipments as well as to traffic of all kinds. It has been already adopted in the case of many shipments of steel products. The car supply in the Connellsville coke regions continues light, with no signs of improvement, and the congestion there is as serious as ever.

Our Manganese and Chromium Supplies*

Some of the Problems and Their Solution—Role of the Electric Furnace—Substitutes for Manganese—Higher Prices for Ores—The Chromium Situation

BY J. E. JOHNSON, JR.

THE war has brought about a situation in regard to several minerals which is unprecedented in the world's history. America has been liberally endowed by nature with most of those minerals which are required for the purposes of civilization, among the first of which are coal and iron ore, but in regard to others, quantitatively less important but still vital to our progress, she has not been so generous to us. Hitherto this has made no difference to us; cheap and unrestricted navigation to and from all parts of the world have supplied without difficulty those things of which our own supply was scanty or wanting, but with a blockade existing in a large part of the world, with a huge proportion of the world's total tonnage of ships sunk and most of the rest commandeered by the governments for war purposes, the supply of ships for commercial work has become almost a vanishing quantity. In some cases it is not a matter of price but of a lack of bottoms at any price.

Some minerals which could be imported more cheaply than they could be produced, can no longer be obtained abroad except at prohibitive prices and our own supplies must now be developed, be the cost what it may. In regard to those minerals of which we have no supply of our own, the situation is exceedingly serious. These are the underlying causes which have produced an abnormal situation in regard to all the minerals of which I shall speak but the details vary in the different cases.

Supplies of Manganese

This is one of the minerals with which nature has been niggardly in her supply to America and it has been imported to supply our needs, either as ore or as ferromanganese. This need comes from the fact that about 17 lb. of manganese, or roughly three-quarters of one per cent, are required per gross ton of steel to deoxidize the steel and make it a useful product. We are not using any more manganese per ton of steel than we were formerly, rather less, but our total consumption tends to rise because of the unprecedented output of the steel industry under present conditions.

We have had in the past three principal sources of supply which are in fact the three principal manganese producing districts of the world: Russia, India and Brazil. This is the order of importance of the districts from a tonnage point of view in the pre-war period, though Brazil was a bad third, producing roughly only about one-quarter of a million tons as against nearly a million for Russia. The Russian deposits are cut off from us entirely by the closing of the Dardanelles. The Indian fields are at so great a distance that the freight under present conditions has become absolutely prohibitive. Of the three, therefore, only the Brazilian remains available to us.

For several years past practically no manganese has been produced in the United States until present conditions caused renewed activity in mining this mineral, but the Geological Survey advises me that the total supply of manganiferous materials in this country is considerable although much of it is low grade. With development our domestic ores could supply a large part of our needs if we make our metallurgy fit the conditions.

The Metallurgical Problem

The metallurgical side of this situation is a very important one. There have been in the last only two varieties of manganese alloy in common use, spiegeleisen, containing about 20 per cent manganese and 5 per cent carbon, and 80 per cent standard ferromanganese with about 6 per cent carbon.

In the days when the Bessemer process was the only one of any importance for producing steel and when rails were the principal steel product made, the use of speigel was almost universal. It was melted in cupolas alongside those for supplying the Bessemer; it was tapped as required from the cupola into a ladle which was charged with the required amount for a heat, taken to the converter and poured into the bath after the completion of the blow.

You will note that the ratio of carbon to manganese is about one to four in spiegel, whereas it is about one to fourteen in ferromanganese. This means that one per cent of manganese imparted to the steel with spiegeleisen would raise the carbon 25 points, whereas if imparted by ferromanganese it would only raise the carbon about 7 points. Assuming the carbon to be blown down to 0.08 per cent in both cases, the total carbon with one per cent manganese would be 0.33 per cent in one case and 0.15 per cent in the other; 0.33 per cent carbon is much less than is required for rails, and the remainder of the recarbonization was accomplished by adding straight pig iron.

When the open-hearth came in, all this was changed. The open-hearth brought about the application of steel to a multitude of purposes for which wrought iron had been used in the past. The steel to be suitable for these purposes must be low in carbon. For a vast proportion of the total output, exclusive of rails, the 0.33 per cent carbon is entirely too high. This situation brought about the use of ferromanganese, and once introduced its use grew. On account of its small volume, it could be charged direct into the furnace or the ladle and all the bother of handling another ladle of molten material was eliminated. As rails have become a decreasing percentage of our steel output, the importance of the low carbon steels has grown greater and greater and in the period immediately before the war there was no sale for spiegeleisen. The New Jersey Zinc Co. had stacked up more than 30,000 tons of spiegel which was virtually unsalable under the conditions then prevailing. The material was produced as a by-product and the situation was a serious one for that company. A few months after, the present conditions in the steel industry began to appear and this huge accumulation was all sold at prices many dollars higher than those which previously the company would have been glad to take.

The high grade manganese ores are, therefore, necessary if we are to produce ferromanganese. It was for this reason that our numerous enormous deposits of low grade materials have remained undeveloped. If more than a certain limited percentage of iron, roughly one-sixth of the amount of manganese, be present, standard 80 per cent ferromanganese cannot be produced. Spiegel, as I have already shown, is normally almost unsalable.

Not alone the presence of iron ruins manganese ores, but phosphorus and silica as well. Phosphorus becomes increasingly important as the content of manganese is lower because the amount of alloy to be added obviously increases as the percentage of manganese in it decreases, and a phosphorus content which might be tolerable in a 50 per cent manganese ore may be prohibitive in a 25 per cent ore. Silica is objectionable because of the loss of manganese that it causes.

Manganese is very much more active chemically than iron. It is easily possible to run an iron blast

*From an address on "The Situation in Regard to Manganese, Sulphur Pyrite and Other War Materials," before the Engineers' Society of Western Pennsylvania, on Tuesday evening, Nov. 27. The author is a consulting engineer, New York.

furnace so as to keep the iron content of the slag down to 0.2 per cent or under, but with manganese this is not the case. Each unit of silica carries away with it in the slag a proportion of manganese, this proportion depending roughly on the amount of other bases in the slag and on the temperature at which the furnace is run. If the temperature is high, the reduction of manganese is more complete than if it is low, but we are not free even to attempt to make a complete recovery by raising the temperature indefinitely since we run into another difficulty by so doing. Manganese is volatile and is driven off as a vapor in the hearth and passes out with the gases in a huge yellow cloud which you can see coming out of the boiler stack at most ferromanganese furnaces. The cinder, on the other hand, always has a strong yellowish-green tint, characteristic of manganiferous slags. It used to be considered that of the total manganese charged, one-third was lost, but practice in this respect has been greatly bettered in recent years. One of the best furnacemen in the country claims to be running with a loss of 15 per cent. I have heard stories of other losses much lower than this but the information was so indirect that I cannot feel assured of its correctness.

Returning now to the ores, it has been customary to penalize all silica in excess of 12 per cent for the reasons just given. The recoverable manganese in the ore is smaller and smaller as the silica rises. This condition has made worthless the low manganese ores, even when they were approximately free from iron, because manganese could not be produced from them without a loss that was commercially prohibitive. To summarize we have here then the following situation:

A small tonnage of high grade ore in the United States; a considerable tonnage of low grade manganiferous material not suitable for ferromanganese manufacture because of either too much iron, too much silica, or too much phosphorus, or a combination of all three; a steel works demand for a manganese alloy with a low ratio of carbon to manganese so that low carbon steels can be produced containing enough manganese to deoxidize them thoroughly; the requirement that an ore to produce the desired alloy must be pure.

The Problem and Its Solution

In the face of the present scarcity of ships, which has already limited severely our imports of rich manganese ore and which threatens to limit it still more severely, what are we going to do? The answer is not to be found in a sentence but only by applying these rigid conditions to each problem and working out the best solution on its merits. The solutions broadly are to be found along three lines.

First, the absolute conservation of ferromanganese for steels, the requirements of which rigidly demand that they be low in carbon.

Second, breaking down our metallurgical prejudice in favor of the exclusive use of high grade alloys and using 70, 60, 50, 40 and 30 per cent alloys for those purposes in which the carbon and manganese requirements of the product permit their utilization. This is a matter of psychology as much as of practice. We must overcome the inertia of the steel men, which very naturally prejudices them in favor of the practice to which they are accustomed. They must get out of this rut and learn to do something different, not only because it may be cheaper, but because the safety of our country as a whole depends upon our production and because the outcome of the war depends upon the production of steel.

Third, the specifications for steel should be rigidly revised by all steel manufacturers and steel users, perhaps under the auspices of the American Society for Testing Materials, so as to lower the manganese requirements in all cases where the absolute necessities of the case do not require them to be as high as at present. Some of our best steel makers are convinced that the present specifications for manganese in many classes of material are higher than they used to be, and I will suggest to you the possibility that, in the manufacture of steel, manganese, like charity, may cover a multitude of sins. I believe that steel well made can have its manganese content distinctly lowered and still be better than a badly made steel doused with a parting hypodermic of manganese to make it stagger through the tests.

Fourth, changes in the metallurgy of manganese itself. The electric furnace has been used for several years in Europe in the production of ferromanganese, and its application to this purpose has made a good start in the United States. It has distinct advantages over the blast furnace under present conditions for the price of the product is so high, that the balance in favor of coke as against electric power for its production no longer controls.

The electric furnace has the great advantage that it uses very little fuel in comparison with the blast furnace and therefore does not have to contend with anything like silica which comes from that source in the blast furnace and all af which takes its toll from manganese when it goes out as slag. Further than this, part of the silica, a very considerable part, can be reduced and combined with the manganese to form a ferrosilicon manganese; this has a distinct advantage. It prevents the loss of manganese which accompanies the silica when the latter is slagged, and what is even more important, it forces down the carbon. I am advised that in ferromanganese, containing 10 or 15 per cent of silicon, the carbon is only about 2 per cent instead of 6.

This means that the carbon-manganese ratio in such a material is far lower than in straight ferromanganese, even though its content of manganese be materially lower than that of the standard alloy. This offers us possibilities which I believe have not yet been fully realized. I refer to that of using a mixture of spiegel, or low grade ferromanganese, with this silico-ferromanganese, so as to obtain the required amount of manganese without permitting the carbon to rise above the desired percentage.

In talking with one of the electric furnace people recently, he made the claim that by melting the ferromanganese before charging, a saving of about 20 per cent in the amount required could be made. This, of course is a statement of an interested party, but there seems to be good reason for believing that at least some improvement could be made in this way and if so, there is no excuse under present conditions for not making it.

Beneficiation of Manganese Ores

You will naturally ask why the lower grade ores of manganese cannot be treated like other low grade ores and brought up to standard metallurgical grade by washing, jigging or some other process. The answer to this question is twofold: first, the cheapness of the imported ores has made such a course commercially unprofitable until recently; second, the nature of the manganese minerals themselves.

Manganese seems to have the faculty of diffusing itself through gangue material in a condition of almost impalpable fineness and while in many cases there is no chemical union between the two, the problem of separating them by any of the accepted methods of ore treatment has so far failed absolutely. Of course, when lumpy manganese is associated with clay, the latter can be washed out, or if it is mixed with particles of rock, these can be jigged out; but there is a great deal of material containing 20 to 30 per cent of manganese and about 25 per cent of silica with a considerable amount of alumina. This material has a consistency about like that of stove polish and no method of ore treatment, so far developed, has sufficed for the apparently easy task of separating this simple mechanical mixture.

Experiments are under way at the present time looking to a solution of this problem along lines radically novel but the investigation is as yet incomplete and is entirely unprotected by patents. We are hopeful that within a few months very low grade material now worthless can be converted into extremely high grade ferromanganese, but it is obviously unsuitable to speak further of this at the present time.

Substitutes for Manganese

Various substitutes for manganese have been proposed. Many years ago Henry D. Hibbard tried deoxidizing a heat of steel with ferrosilicon. He killed the heat absolutely so that it poured like cream, but when the ingot went through the rolls it broke up into pieces more like bird-shot than like billets. In other words, in spite of its higher heat of combustion, silicon has nothing like the deoxidizing power of manganese in steel. It has been found that about 25 per cent of the work of deoxidation could be done by silicon but that the remainder had to be done by ferromanganese.

In the electric furnace, I am advised that this con-

dition does not exist and that a heat can be so thoroughly killed and deoxidized in the electric furnace that good steel can be made without the addition of any manganese. It is doubtful, however, if our prejudices would permit us to accept such steel without a much longer time of trial than we have available under present conditions.

It has been proposed by various people to use other metalloids or particularly combinations of these, such as calcium-silicon or calcium-silicon-aluminum in such proportions that their oxides after they had been converted to oxide in deoxidizing the bath would form a fluid slag and so free itself from the steel in the way that the oxide in manganese does. I am told that this has been done extensively in Europe but this practice has not been developed to any important extent in this country.

Conserving Manganese in Steel Making

One of the most hopeful methods of bettering conditions is by so altering our practice as to leave the manganese in rather than to introduce it at the end of the process. While ores high enough in manganese to be considered as ores of that element are scarce, there are available enormous tonnages of manganiferous iron ore, and some of even the very lean grade manganiferous material can be charged into the furnace to produce a high manganese pig iron without causing excessive expense by increasing the slag volume. Then by starting steel manufacture with an iron containing more than one per cent of manganese and preferably two, an important amount of manganese can be left in the bath at the conclusion of the oxidizing operation which is the essence of steel making.

This manganese has two good effects—first, by its presence it tends to prevent excessive oxidation of the heat; second, it replaces at least a part of the manganese which must otherwise come from the scarce high grade alloys. Somewhat similar results can be obtained by adding enough manganese ore to the slag to make it decidedly manganiferous. I am informed that by this means there occurs a very considerable reduction of the manganese oxide to metallic manganese by the metalloids of the bath and that the manganese content of the iron rises as the heat progresses. My information is not sufficient to permit any figures as to the relative consumption of manganese by this process and by the other. My feeling is that the efficiency of the manganese would be higher if charged into the blast furnace and almost completely reduced there than if charged into the open-hearth and only reduced to a fractional extent.

The situation which confronts us in regard to manganese is acute and it is a commercial duty and a patriotic necessity to conserve the supply, not by one means but by all within our power. I hope to see shortly a meeting of the metallurgists of all the steel plants of the country under instruction from the executives of their respective countries to thrash out all these matters to the very bottom; each one to have instructions from his chief, not to strive for a partisan advantage, but as a matter of patriotic duty to lay all the cards on the table and give to all the experience and knowledge of each for the benefit of the country as a whole.

Higher Prices for Manganese

Let me close this portion of my subject with a warning. The thing for the steel men of this country to hope for is that the price of manganese will go higher. The shipping situation is so serious that ships are almost certain to be taken out of the manganese trade and that will cut off a corresponding percentage of our present supply of manganese ore. It is positively known that our supplies in this country are sufficient to last us for two or three years if they are intelligently handled but they will do us no good unless they are developed and they will not be developed unless it can be done at a profit to someone.

I have recently urged upon the Government Bureaus with the utmost emphasis at my command the absolute indispensability of a pronouncement from the highest authority in Washington that the price of manganese ore would not be regulated downward during the period of the war and I have recommended to them that if pursuant to this policy the price of manganese should rise, as it probably will, that the steel makers should be allowed a compensating increase in the prices fixed for their product.

The Bureaus of the Government are, I believe, favorable to this idea and if you work along this line, you can accomplish much, but if you take the short-sighted view of holding down the price of manganese by price regulation, the steel industry as a whole and the country with it is likely to suffer because of the fact that manganese which you can get at $500 a ton is much better than manganese at a nominal price of $100 which you can't get.

Supplies of Chromium

The importance of chromium to the steel industry is twofold. First, when alloyed with steel in small percentages, it exercises a tremendous effect on the physical qualities of the material, raising the elastic limit and increasing the hardness. It also has a marked effect in intensifying the effect of other alloying elements. Chrome steels, with relatively very high percentages of chromium, are used where extreme hardness is desired—in crusher jaws, stamp dies, roll shells and the like. When alloyed in smaller percentages with vanadium or nickel, it gives wonderful properties to steel used for high grade construction purposes; automobile and aeroplane steel are very largely chromium steels.

Second, it is used in the form of oxide as a refractory. The oxide has an extremely high melting point and is chemically exceedingly inactive. For this reason chrome bricks have become almost indispensable in certain parts of the open-hearth furnace.

Our supplies of this material have come in the past principally from Greece, New Caledonia, Rhodesia and Russia. These are all far distant points, measured in terms of present-day freight rates so that our recent supplies of chromium have been woefully inadequate and the price risen to correspond. This has fostered the development of mines in Canada and later in this country.

Chromium appears on this Continent at least to be a pockety material, it occurs as a segregation or as a breaking-down product of certain eruptive rocks, and deposits of this character are in general of relatively small size and uncertain in extent. A considerable interest has been aroused on the West coast where there are a number of deposits and there is room to hope that these, in addition to those which are now producing some by the introduction of ore-dressing methods, will be able to make an acceptable product.

Except through Governmental action, which now appears unlikely, the price of chromium will probably not decline while the war continues, for there is no hope that the shipping situation will ease up for a year or more and not much likelihood that we shall develop mines of chromium in this country comparable with those from which our supply has come in the past.

[After discussing the question of potash supplies, Mr. Johnson concluded his address with the following general remarks.]

In conclusion I wish to leave with you one thought in connection with that event to which all our energies and hopes are directed, the settlement of the war on terms satisfactory to us. Many of the questions involved are matters of world politics which we perhaps may not be competent to discuss, but one of them is a matter in which our knowledge and opinion should guide the rest of the world. In recent years great deposits of potash have been discovered in Alsace. I understand that little is known about these yet except that they are very extensive. In the post-war period we can well conceive that Germany will be bled dry financially and she will be unable to pay in money for the crimes which she has committed, but she may be made to pay in resources which can be readily turned into cash and of these one of the best is obviously a vitally important fertilizing material of which the world's supply is all too scanty.

Lorraine Iron Ore and Peace

But Alsace-Lorraine involves a question even more important, if such a thing be possible, than justice to France. It involves the possible future safety of the world. You do not need me to tell you that the raw materials of war to-day are iron and steel. Without them no nation could last a week. In Lorraine and Luxemburg are one of the greatest deposits of ore in the world, low grade it is true, measured by our standards but still commercially of immense value and utilized to the extent of 90 per cent in Germany's iron industry before the war. This ore body then constitutes a huge potential arsenal, for without it or its equivalent all other arsenals would be useless. The question then which will confront the world at the peace conference is: To whom shall be entrusted the guardianship of a great potential arsenal; Germany, who has proven herself an assassin ready to arm herself to the teeth and spring on her victim unaware, or France, who in spite of hardship and suffering has kept burning in a steady and brilliant blaze the fires of liberty, civilization and peaceful industry? This is a question which politicians do not understand or realize. It is one of your great duties as the iron and steel men of the world's greatest steel center to force on the public an understanding of it so that intelligent public opinion will demand insistently that the motto which controls in the disposition of Alsace and Lorraine is that which your work in the past 10 years has made famous—"Safety First."

Extras on Tin Plate

The following statement by E. H. Gary, chairman, Committee on Steel and Steel Products of the American Iron and Steel Institute was issued Nov. 27.:

E. H. Gary, chairman, Committee on Steel and Steel Products, American Iron and Steel Institute, referring to the recommendation of the committee, under date of Nov. 20, covering certain differentials and extras on sheets, tin plates and round billets for seamless tubes, states that the Committee now recommends a further list of extras on tin plates covering width and length on cokes and charcoals as follows:

WIDTH AND LENGTH EXTRAS ON COKES AND CHARCOALS
All Grades—Cokes to Premier Charcoals:—

No. 16 gage to No. 24 gage, inclusive
1c. per 100 lb. for each inch or fraction over 30 in. wide.
1c. per 100 lb. for each inch or fraction over 30 in. long.

195 lb. to 90 lb., inclusive.
5c. basis for each inch or fraction over 28 in. wide.
2c. basis for each inch or fraction over 30 in. long.

Lighter than 90 lb. to 75 lb.
10c. basis for each inch or fraction over 28 in. wide.
4c. basis for each inch or fraction over 30 in. long.

Lighter than 75 lb. to 55 lb.
15c. basis for each inch or fraction over 28 in. wide.
5c. basis for each inch or fraction over 30 in. long.

The Austin Co., Cleveland, is erecting four new buildings for the New York Air Brake Co. at Watertown, N. Y. Two of these are 90 x 1000 ft., one 90 x 800 ft., and one 250 x 400 ft. These are in addition to a building 100 x 802 ft. recently completed by the same builder for this company. The Austin Co. has also recently taken a contract for a Government building at Jacksonville, Ind., 45 x 167 ft., to be used for sponging cloth, a building for the Four Lakes Ordnance Co., Madison, Wis., 150 x 500 ft., the contract including heat, lighting, plumbing and the installation of a traveling crane, two buildings for the Illinois Watch Co., one 146 x 40 ft. and one 82 x 29 ft., and an additional building for the Elyria Iron & Steel Co., Cleveland, 60 x 300 ft.

Twelve of 117 drafted men of Manitowoc, Wis., leaving for the National Army cantonment at Camp Custer, Battle Creek, Mich., on Nov. 20, were held at home on Government orders which indicated that the men will be recruited in the industrial naval reserve for service in the plant of the Manitowoc Shipbuilding Co., a large shipyard which was commandeered by the Government several months ago.

CHANGE IN AIRPLANE PROGRAM

Liberty Motor Will Be Built for Scout Duty and French Motors for Fighting 'Planes

Recent rumors that the Liberty airplane engine had proved a failure are emphatically denied in official quarters in Washington. Unofficially, THE IRON AGE learns, however, that a decision has been reached to limit the use of the Liberty motor to scout duty and the time-tried French motors will be used on the battle airplanes used by the United States Government. In various ways, the airplane plans of France and the United States appear to have been consolidated. "The French-American airplane program" is a phrase that is now frequently used in Washington.

The decision to use the Liberty motor for scout duty only is believed to have followed the criticism of French airplane experts that the United States in putting all its faith in the one motor was placing its eggs all in one basket, and that if, under actual fighting conditions, the Liberty motor did not measure fully up to expectations, there would be nothing to fall back upon. The motors which the French and English have used most successfully in battle are the Renault Gnome, Hispano-Suiza and the Rolls-Royce. It is now apparent that this Government will build a certain number of each of these motors in the United States. Contracts have recently been placed with American manufacturers for Renault and Hispano-Suiza motors and other contracts are pending. In addition, this Government will provide additional equipment for the French automobile plants which are making airplane engines and will also supply several thousand mechanics, who are now being recruited. The original program was to build only 5000 Liberty motors in France, but latest information is to the effect that the United States will assist the French in building a large number of French and English engines as well.

An important step in the airplane program was the taking over by the Aircraft Production Board of the plant and equipment of the General Vehicle Co., Long Island City, N. Y., at a price said to have been fixed at $2,500,000. The General Vehicle Co. has been figuring for some time on a large contract for the manufacture of Gnome motors and had issued a list of about 900 machine tools to be purchased. The plant will probably be used by the Aircraft Production Board for experiments in airplane engine construction.

October Ferromanganese Imports Small

Ferromanganese imports into the United States in October were only about 2000 tons, or the lowest for any month this year. According to reports to THE IRON AGE, 1135 tons of this came through the port of Philadelphia and 865 tons through Baltimore.

The pupils of the schools of Baltimore, Md., are to be told of the city's greatness as a manufacturing and industrial center through a plan advanced by A. S. Goldsborough, director of the Civic and Industrial Bureau of the Merchants and Manufacturers' Association, with the approval of the Board of School Commissioners. A series of lectures will be given in the Polytechnic Institute, City College, Teachers' Training School and the high schools. Among those who will deliver the lectures and their subjects are Holden A. Evans, president of the Baltimore Dry Docks & Shipbuilding Co., "Baltimore as a Shipbuilding Center and Why It Should Be a Leader"; and J. A. Davis of the Bethlehem Steel Co., "Baltimore as a Steel-Making Center."

It is announced that the Pennsylvania Railroad Co. plans to increase the ore-handling facilities at Erie, Pa., by the erection of a new dock and storage tracks. It is stated that the improvement will involve an expenditure of $2,000,000.

The Government and Iron and Steel Prices

Further Hearings on the Pomerene Bill Expected, but Its Passage Is Not Likely by Jan. 1, If at All

WASHINGTON, Nov. 27.—The question as to the program to be pursued with respect to the Pomerene bill providing for governmental control of iron and steel prices will be considered at a meeting of the Senate Committee on Interstate Commerce to be held next week and interest in the outcome is intensified by the fact that the existing arrangement, under which the President has promulgated prices fixed as the result of negotiations with the committee representing the steel industry, expires on Jan. 1. The bill is now in the hands of a subcommittee of which its author, Senator Pomerene, and its most energetic advocate, Senator Cummins of Iowa, are the leading members. Senator Pomerene has reached Washington and it is understood that a quorum, both of the full committee and of the subcommittee, will be here when Congress re-convenes next Monday.

"It is too early for me to form an opinion as to the action that will be taken on my bill," said Senator Pomerene to the correspondent of THE IRON AGE. "I gather from correspondence and as the result of intercourse with business men that there is no abatement of interest in this subject and it is evident that the importance of the steel industry to the country in the conduct of the war is increasing rather than diminishing. Our subcommittee has given considerable attention to the measure and I expect that we shall take it up again very soon and reach a decision as to the recommendation we shall make to the Senate. I have given the matter considerable thought during the recess and my convictions on the subject are quite as strong if not stronger than they were when I originally presented my bill."

Cannot Pass by Jan. 1

Notwithstanding the fact that certain members of the Senate Committee express the opinion that the Pomerene bill can be passed by Congress in time to become effective when the present arrangement as to steel prices expires on Jan. 1 next, there is really little basis for such a belief. The expectation that the bill can be put through within the next 30 days is based almost wholly upon the fact that the Sixty-fifth Congress is already organized and that the active work of legislation may begin as soon as the two houses reassemble. On the other hand, however, although Congress will convene on Dec. 3 it will adjourn for the holiday recess about Dec. 20 until Jan. 4, leaving only about 15 working days before the first of the new year. Even should the subcommittee report the bill at its first meeting it would undoubtedly be debated at some length in the full committee and, as the committee will hold but one meeting a week, it is unlikely that the bill can be reported to the Senate much before the holiday recess. At least a dozen Senators are prepared to discuss so promising a subject as governmental price-fixing in the iron and steel industry and the debate on this measure would undoubtedly consume a week or ten days even if its immediate consideration could be secured.

Hearings for Steel Consumers

The situation in the House foreshadows still further delay. The bill would probably be referred to the House Committee on Interstate and Foreign Commerce which will be reorganized under the chairmanship of Representative Sims, of Tennessee, who succeeds Representative Adamson, of Georgia, recently transferred to the Board of United States General Appraisers. Several members of this committee have already begun a study of the Pomerene bill and are prepared to demand hearings for steel consumers. They point out that while the Senate committee issued a general invitation to all interested parties to appear at the hearings accorded at the last session, the notice was so brief and the hearings were so limited that no one representing actual consumers took advantage of the opportunity. Assurances are now given that if the House committee takes the matter up there will be plenty of witnesses to keep the hearings going for a considerable period. It is safe to say that it will require not less than 30 days and possibly a much longer time for the House committee to consider the measure and for the House to pass it. A further delay would ensue in the event the House changed the Senate bill in any important particular as it would then be necessary to refer the measure to a conference committee.

Presidential Price Fixing

Sentiment in Congress and especially in the House is growing in favor of that feature of the Pomerene bill which authorizes the President "whenever and wherever in his judgment necessary for the efficient prosecution of the war for the purposes aforesaid, to fix the price of iron ore, iron, steel, and their products wherever and whenever sold, either by producer or dealer, to establish rules for the regulation of and to regulate the production, sale, shipment, distribution, apportionment, or storage thereof among dealers and consumers, domestic or foreign." The proposition is also favored that the President shall exercise this authority through the agency of the Federal Trade Commission and that in the event that any producer or dealer fails or neglects to conform to promulgated prices the President shall have power to take over his plant or his business and operate it through any agency he may select for the purpose. This method of procedure, it is contended is likely to prove more satisfactory than the alternative proposition embodied in the Pomerene bill giving power to the President to require all producers of iron ore, iron, steel and their products "to sell their products or designated portions thereof only to the United States through an agency to be designated by the President, such agency to regulate the resale of and to resell such iron ore, iron, steel, and their products or designated portions thereof and to regulate and fix the prices thereof, and to establish rules for the regulation of and to regulate the production, shipment, distribution, apportionment, or storage thereof among dealers, consumers, domestic or foreign, and to make payment of the purchase price thereof to the producers thereof, or to the person or persons legally entitled to said payment."

It is not proposed, however, to strike from the measure the alternative provision quoted but to leave it in the bill for the purpose of strengthening the President's hands. If clothed with full powers the President, it is pointed out, will be able to control the entire situation with respect to prices without difficulty and without raising the vexatious questions that might arise under the alternative provision of the Pomerene bill, which might result in the arbitrary commandeering of output and the raising of issues as to consequential damages.

Federal Trade Commission for Lower Prices

Developments with reference to the Pomerene bill are being closely followed by the Federal Trade Commission, the members of which not only favor legislation on this subject but are practically on the record, through Commissioner Davies' declarations, as advocating the abrogation of contracts, especially those made at prices above the present market. Certain members of the commission also are strongly in favor of the substitution of a law for the present mutual consent arrangement and believe that there should be a general scaling down of all the prices thus far promulgated and especially a substantial reduction in the price of pig iron and other basic products. Members of the commission feel that the elaborate investigation into the cost of producing iron and steel in various forms, which preceded the promulgation by the President of the first schedule in which the price of pig iron was fixed, was a waste of time and that the figures obtained by the commission's experts were wholly ignored.

Commissioner Davies compiled a voluminous report on costs of production and utilized some of his figures in the elaborate statement he made before the Senate committee during the consideration of the Pomerene bill. Only a small part of the data gathered in the cost investigation has been published, however, and the opinion is entertained by certain members of the commission that a comparison of the report with the schedule of prices since promulgated would make an exceedingly interesting exhibit that would probably hasten the passage of the Pomerene bill or some similar legislation.

Steel Men Do Not Expect a Change

To the extent that representatives of the steel industry here will express any opinion on the subject, it appears to be their view that there is no necessity for legislation dealing with price fixing so long as the matter can be handled so satisfactorily by negotiation. It is urged in this connection that the situation with respect to prices and supplies of iron and steel is certainly much better than that concerning coal and coke, the cost and distribution of which the President is specifically authorized to regulate by the terms of the lever food, feed and fuel act. Emphasis is put upon the fact that there is no steel famine nor marked shortage, except so far as the actual tie-up of loaded cars has produced congestion in certain districts, and this, of course, is in no way attributable to lack of Presidential authority to fix prices or regulate distribution. The steel men here who are co-operating with the Council of National Defense do not expect that the Pomerene bill will be passed in the near future and express the opinion that when the present arrangement expires on Jan. 1 it will be renewed for a considerable period as the result of negotiations between the war industries board and representatives of the steel industry.

W. L. C.

Serious Car Shortage

SEATTLE, Nov. 24.—The most serious question confronting manufacturers in the Northwest is the extreme car shortage, which has now reached the state of Washington. Strenuous efforts are being made to obtain relief, but this has not been forthcoming. The lumber industry is particularly affected, and a number of mills are facing a complete shutdown unless cars are speedily available. The organization of the extensive lumbering operations to get out spruce for military airplanes is progressing rapidly, and huge tracts from Alaska to southern Oregon will be opened up. Dozens of sawmills will be released from ordinary work, and labor exclusively into the manufacture of airplane work.

STEEL CORPORATION AT MOBILE

Shipyard Construction to Be Pushed—The New Mills at Fairfield

President George G. Crawford of the Tennessee Coal, Iron & Railroad Co., has given out this week the following statement concerning the United States Steel Corporation's shipbuilding plant at Mobile, Ala., on which construction work will begin at once. The principal officers of the new company, which will be known as the Chickasaw Shipbuilding Co., are identical with those of the Tennessee company. The statement gives more detail than has been published heretofore concerning plate and structural mills and the other capacity that will be provided at Fairfield, Ala., to supply material for the new shipyard.

It is proposed to begin construction immediately on a shipyard upon the land recently purchased north of Mobile, Ala. Ten shipways will be laid down and wharves of suitable capacity for fitting out the ships will be built. A large power plant, boiler shop, plate and angle shop, machine shop, steel metal shop, joiner shop, forge shop, storehouse and main office will be constructed.

Two large villages have been laid out, one for white and the other for colored workmen. Both villages will have paved main streets and sidewalks, storm and sanitary sewers, a pure water supply and street railway and electric light service. About 1600 houses of attractive appearance will be completed during the next twelve months. The health, safety, comfort and recreation of the employees and their families will be considered in planning the works and villages.

The construction of the shipbuilding plant will be done by the Chickasaw Shipbuilding Co. The board of directors will be as follows: E. H. Gary, J. A. Farrell, George G. Crawford, H. C. Ryding, L. T. Beecher. The officers of the company will be: George G. Crawford, president; H. C. Ryding, vice-president; J. F. Coleman, general superintendent; L. T. Beecher, secretary and treasurer; F. B. Winslow, auditor; A. W. Carey, traffic manager; Geo. H. Gray, purchasing agent; Lloyd Noland, superintendent health department; F. M. Joy, superintendent roads and buildings department; J. F. Vance, superintendent central labor bureau.

For the purpose of supplying steel plates and shapes suitable for building ships, the following construction is now under way at the Fairfield works of the Tennessee Coal, Iron & Railroad Co.: A 40-in. blooming mill, a 110-in. plate mill, a 26-in. shape mill, and 600 houses for employees. In addition there will be constructed at Fairfield the following plants for the manufacture of parts and machinery for ships: A plate and angle shop, a forge shop, a foundry, a machine shop and 400 houses for employees.

To secure additional steel capacity a third converter will be installed in the converting mill at Ensley Works and an additional open hearth furnace of larger size than the existing furnaces.

Will Meet in Cleveland

The triple convention of the National Supply and Machinery Dealers' Association, the Southern Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association will be held in Cleveland on May 15, 16 and 17, 1918, according to the announcement just issued to members by F. D. Mitchell, Woolworth Building, New York, secretary of the latter organization.

The Chicago Superheater Co., Chicago, has been formed to engage in the manufacture of locomotive, marine and stationary superheaters and independently stoker-fired superheaters. The company's offices are in the First National Bank Building, 38 South Dearborn Street. Officers are Charles F. O'Connell, president; Edward A. Geoghegan, vice-president and mechanical engineer, and N. L. O'Connell, secretary.

Book Reviews

Electric Furnaces in the Iron and Steel Industry. By I. W. Rodenhauser, J. Schoenawa and C. H. Vom Baur. Pages XVIII + 429, 6 x 9, illustrated. Published by John Wiley & Sons, New York. Price, $3.75.

With the great growth of the electric steel industry, especially in the United States, where nearly every type of furnace is in commercial operation, a book containing up-to-date theoretical and practical information on this subject answers a real necessity and will be warmly welcomed. The second edition of this work adequately meets every present demand and is as modern in its data as it is possible for a book to be.

About five years ago the first edition appeared with Mr. Vom Baur as the translator of the German original. The new edition is now offered as largely rewritten, and Mr. Vom Baur is joint author, owing to the large amount of original matter incorporated. The author has had a wide experience in practical electric furnace work, especially from the electrical engineering standpoint, and his acquaintance with leaders in the new field has opened up valuable sources of information, much of which he has been able to incorporate in a book now largely his own.

Comparing this edition with the original, Chapters 1, 2, 3 and 4 are unchanged; they treat of general historical and theoretical matters. Chapter 5, "General Conditions for the Operation of Electric Furnaces," has been amplified to some extent. Chapter 6, "Arc Furnaces in General" has been largely rewritten with the aid of first-hand data from Dr. Carl Hering. The importance of this chapter is emphasized by the fact that the great majority of electric furnaces in the United States are of the arc type.

Chapter 7, "The Stassano Furnace," has also been rewritten and the author shows why the furnace had to be taken from active competition. Chapter 8, "The Heroult Furnace," is an entirely new one and contains very recent data from reliable sources. Chapter 9, "The Girod Furnace," is unaltered with the exception of a new illustration. Chapter 10, "The Rennerfelt Furnace," has been completely rewritten from the author's own experience and observation. Chapters 11 and 12 on "The Induction Furnace" and "The Kjellin Furnace" are practically unchanged. Chapter 13, "The Röchling-Rodenhauser," has been modified somewhat. An interesting addition are two illustrations of the large transformer core and coils of the 20-ton induction furnaces at Lebanon, Pa. Chapter 14, "The Electric Shaft Furnace," has not been changed much. In Part II of the book, under "The Electric Metallurgy of Iron and Steel," Mr. Vom Baur has added a great deal concerning iron smelting in the "Heroult" furnace, now the Crawford furnace at Heroult, Shasta County, Cal.

In a "General Review," Chapter 15, the treatment of the Grönwall-Dixon furnace has been expanded, with a few pages on the Greaves-Etchells furnace, recently introduced into this country. The Snyder furnace is discussed in a few words as not in large use because of its single phase and its low power factor of 60 per cent.

Part II treats of the "Materials for Furnace Construction and the Costs of Operation." Carborundum brick are mentioned as giving good results under certain conditions. The electric steel output of the world is considered and on page 304 J. H. Gray is quoted as stating that with a 6-ton basic Heroult furnace, operating 24-hr. each day and 6 days each week, with electricity at 1c. per kw. hr., the cost of refined steel, one or two slags, should not be on the average over $15 per ton, plus the cost of scrap in normal times. There is much other new material in this section.

The author emphasizes the use of the electric furnace for melting ferromanganese before its introduction into the molten steel, saving 20 to 30 per cent of the alloy and producing a better steel. He cites the fact that there are only two furnaces so used in the United States against 20 to 25 in Europe.

A table on page 271 shows the number of furnaces in the steel industry in the world on July 1, 1917. The grand total was 562, of which 177 were in the United States, 94 in Great Britain, 45 in Sweden, 40 in France and 34 in Canada. The Heroult comprises nearly half or 244, and the Rennerfelt is next with 84.

The Design of Machine Elements. By W. G. Dunkley. Two volumes; pages, 210 with 123 illustrations in Vol. I and 220 with 122 illustrations in Vol. II; 4½ x 7 in. Published by Scott, Greenwood & Son, London, England, D. Van Nostrand Co., 25 Park Place, New York, American distributer. Price, $1.50 per volume.

Described by the publishers as "A handbook for students and draughtsmen engaged in engineering design," and each complete in itself, the above two volumes by an English author make their appearance in what is termed "The Broadway Series of Engineering Handbooks."

The first volume deals with forces and stresses, shafting and bearings, couplings and springs. This volume consists of seven chapters, the opening one dealing briefly with the conditions for equilibrium between forces acting on a body. Then follows a long chapter on "Stress, Strain, Twisting and Bending Moment." Here the ordinary textbook facts on such subjects are dealt with, but in a very practical manner and with very comprehensive examples. The third chapter is devoted to shafts and studs, and the fourth with bearings, pedestals, hangers, wall brackets and swivel pedestals. The fifth chapter deals briefly, but in an up-to-date manner, with ball and roller bearings, the sixth with keys and couplings, and the seventh with springs.

The second volume deals with screws and bolts, clutches, belts and pulleys, and gearing. This volume consists of five chapters, opening with one in which screw threads, bolts, and screws are dealt with at length, discussing standards, methods of measuring and efficiencies of various types. The second chapter deals briefly with belts and pulleys, the information set down being, unfortunately, the least modern of any given in either volume.

The third chapter deals with driving clutches, and is, perhaps, the most comprehensive in either volume. The various types of clutches are explained and illustrated in principle, and excellent data for their construction given. The fourth chapter treats on gearing at length, merely duplicating, however, the data given in any standard work on the subject. The concluding chapter deals with driving chains, lifting chains and wire ropes.

The Application of Efficiency Principles—By George Shepard. Pages X + 368, 5½ x 9 in., illustrated. Published by the Engineering Magazine Co., New York, and for sale by U. P. C. Book Co. Price $3.

The author of this book, a former member of the staff of Harrington Emerson, has attempted to elucidate the twelve principles of efficiency as laid down in the writings of that engineer. In his preface, the author states that while Mr. Emerson made an excellent presentation of the principles in his books, he gave but little information as to the procedure to be followed in their application. This criticism has occurred to more than one reader of the principles, and an attempt is set forth, in a practical manner, the difficulties of using them and the precautions to be observed will be welcomed by many who have sought after efficiency but without any definite knowledge of how to obtain it.

The author treats the subject in a somewhat different manner than it has been handled heretofore. Each principle, as planning, scheduling, despatching, routing, etc., is outlined and restated in the author's own language. Its application is illustrated by citations and examples from various industries and commercial establishments. Several illustrations are given in each case to present the idea from several different angles and to show the wide scope and universal application of the doctrine of efficiency. The author comments on the results and frequently buttresses his comments with quotations from authorities on the subject under discussion. There is no attempt made to trace the entire

set of principles through in their application to a single industry or business.

Whether or not the author has succeeded in accomplishing his object of making more clear the application of Mr. Emerson's principles is an open question. If his idea has been to enable the manufacturer and the business man to install the Emerson methods, using this book and Mr. Emerson's works as textbooks, the reviewer feels that he has not accomplished what he set out to do. The treatment is so disconnected that it would be rather difficult for the uninitiated to link up he twelve principles into a smoothly working mechanism. The principles of efficiency are so interrelated that they must be considered in their effects one upon the other, if the best, in fact, if workable results are to obtain. The efficiency engineer, already familiar with the principles and their working, can readily see this interrelation, but it is doubtful if the untrained mind can, from Prof. Shepard's discussion, connect them into a harmonious whole. From the reviewer's point of view it would have been better to have taken a single industry and followed the application of the principles to it from beginning to end. Variations of the application of the principles could have been appended, showing how they apply to cases of somewhat different character than the one forming the body of the work. This method would have given the reader a clear idea of the mutual dependency of the principles, and at the same time would have shown that they could be adapted to every class of industry.

If however, the author has endeavored to show that the principles of efficiency are of universal application, he has succeeded admirably. His examples are well selected, and the comments on them show judgment and clear thinking. He has covered the subject in a thorough manner, and has met many of the adverse criticisms that have been and still are leveled against the movement of which he is an exponent. The book contains much that is good, and can be read with profit by manufacturers and business men in general. Even the engineer who is familiar with the subject will benefit by reason of the new angle from which his work is viewed. R. K.

The 1918 edition of "Motor Trucks of America," by S. V. Norton, manager of truck tire sales B. F. Goodrich Rubber Co., Akron, Ohio, will be ready for distribution Jan. 1. The book consists of 200 pages of text and illustrations. It is the sixth to be issued in as many years. Complete specifications of nearly 150 of the leading gas and electric-driven motor trucks will be found in the volume. The illustrations show the latest models and the information is compiled by the manufacturers themselves.

A book on industrial conciliation has been prepared by John F. Sherman, 20 Broad Street, New York, intended for distribution among executives. It explains methods he employs in meeting employer-employee dissensions.

STEEL PLANT NEAR SEATTLE

Definite Announcement Follows Report of New York Engineer

Formal announcement that the projected steel plant to be built in the vicinity of Seattle, Wash., is to become a reality has been made by Bart. L. Thane, general manager of the Alaska-Gastineau Mining Corporation and head of the steel syndicate that will construct the plant. Mr. Thane made the announcement at a recent dinner given in his honor by Frederick Karl Struve, banker of Seattle, which was attended by 50 prominent business men of that city. The plant, according to Mr. Thane, will be located in King county, between Seattle and Tacoma, on a site of 1000 acres of level land, adjacent to salt water, with a water level grade to the mines. The site has been under option for months.

Mr. Thane has received the moral support of Seattle business men, and a committee has been named, as follows, to promote the steel plant, and to use its influence to secure Federal approval of the purchase by the steel syndicate of the equipment needed for the construction and operation of the plant: Clarence W. Wiley, president of the Seattle Construction & Dry Dock Co., representing the shipbuilders; F. K. Struve, president of the Seattle National Bank, representing the bankers; A. J. Rhodes, president of the Seattle Chamber of Commerce and Commercial Club, representing Seattle's chief business organization; James D. Lowman, vice-president of the Union Savings & Trust Co., representing the city's business interests at large; William Pigott, president of the Seattle Car & Foundry Co. and vice-president of the Pacific Coast Steel Co., representing the iron and steel men. A. J. Rhodes is chairman of the committee, which will devote its entire influence toward securing necessary materials to insure the construction of the plant, through Government order to the Eastern steel plants.

Mr. Thane states that the steel syndicate is composed of five San Francisco men: William H. Crocker, president of the Crocker National Bank; Wellington Gregg, vice-president of the Crocker Bank; Herber Fleischacker, president of the Anglo-London-Paris and American Bank; Samuel F. B. Morse, manager of the Pacific Improvement Co., and Mr. Thane.

The proposed plant will represent an ultimate expenditure of $25,000,000 and the initial unit to be constructed will cost $9,000,000. The syndicate has spent $250,000 in the various steps of the investigation into the feasibility of the enterprise. Mr. Thane, in discussing the steps taken by the syndicate, said:

"First, we satisfied ourselves as to the present availability of the three materials needed for our pig iron; coke, iron ore and limestone; second, we were interested only in coking coals and iron ores that could be delivered at our strategic center, meaning Seattle, at a total cost not greater than the cost of similar raw materials delivered at furnaces in the East, and we found such coals and ores; third, we studied the market and plant sites, taking two of the latter under option. Then we laid every bit of data before an eastern checking engineer of great repute, J. E. Johnson, Jr., of New York. His report was extremely favorable in all respects. It showed that while the plan originally submitted to him by our engineers called for a $25,000,000 plant, conditions existing now were such as to warrant starting one blast furnace at a cost of $5,000,000, with $4,000,000 to be expended later for the manufacture of steel from the pig iron." The $5,000,000 includes purchase of coal mines and of the large site for the plant and also the cost of leases and development of ore properties.

The project is receiving the hearty support of shipbuilders in the Puget Sound district, who have experienced great difficulty in securing steel from eastern centers, and who have had to pay constantly advancing prices for all such materials. It is conceded that the establishment of a steel plant in the Puget Sound section would insure the permanency and steady growth of the shipbuilding business, with its allied lines of industry.

Mr. Thane states that ground will be broken for the project within 90 days, and that within 18 months after that date the first pig iron will be turned out, if Federal permission to secure materials can be obtained.

The Cleveland Milling Machine Co., Cleveland, has begun the monthly publication of a stock list of milling cutters. The list is contained in a conveniently arranged booklet and includes standard cutters in both high-speed and carbon steel which are in stock and from which immediate shipments can be made. It is published on the fifteenth of each month.

In order to supply electric current on a large scale for electric furnaces in the coming year, the Sheffield City Council of England, has decided to embark on a big and costly scheme which will permit of a large growth in consumption in that district.

CALL FOR AVIATION SERVICE

Crying Need for Skilled Men on the Ground Behind the Lines

IT has been said repeatedly that this war will be won in the air. The United States is building an air fleet that is calculated to astound the fighting world. Factories from Maine to California are working day and night on airplane parts. Guns and oil and gasoline and cameras and other material parts of these war machines are coming along as fast as skilled organized American factories can bring them out. Already they are being assembled, and manufacture of that acme of the American get-together spirit, the Liberty motor, is being pushed as fast as possible.

Ever since the war started, the Government has been establishing aviation schools to perfect the men who will be the eyes of the national army. The machines and many of the fliers are taken care of, but there is a crying need of trained men to care for these machines.

There is a blank at the bottom of the facing page that when properly filled out will be the answer of skilled men to the challenge of skilled brutes. Men of draft age cannot enlist after Dec. 15, under the new selective draft regulations. To complete an enlistment in time one should report to a recruiting officer before Dec. 13.

Here is a list of the kind of men wanted, arranged in the order of number of men needed:

Chauffeurs.
Auto mechanicians.
Automobile engine repair men.
Office clerks.
Carpenters.
Radio operators.
Electricians.
Instrument repair men.
Cooks.
Coppersmiths.
Armorers (machine gun repair men).
Sail makers.
Photographers.
Machinists.
Blacksmiths.
Motorcycle repair men.
Stenographers.
Cabinet makers.
Draftsmen (mechanical).
Magneto repair men.
Metal workers.
Automobile engine testers.
Rope riggers (Cordage workers).
Propeller makers (airplane).
Riggers (airplane assemblers).
Telephone linesmen.
Tool makers.
Vulcanizers.
Welders.
Lithographers.
Packers.
Telephone operators.
Motorcyclists.
Plumbers.
Painters.
Tailors.
Gas works employees.
Buglers.
Molders.
Pattern makers.
Telephone adjusters.
Barbers.
Truck masters.
Brick layers.
Cobblers.
Propeller Testers (airplane).
Boat builders.
Saddlers.
Stock keepers (experts).

New Electric Welding Machine Company Organized

The Taylor Welder Co. is being incorporated under the laws of the State of Ohio to manufacture and sell an electric welding machine employing a new process which is covered by a patent granted to A. C. Taylor. A temporary office has been opened at Warren, Ohio, and it is expected the company will make arrangements to have the machine built by contract at present. Mr. Taylor has been connected with the Winfield Mfg. Co. for a number of years, and was one of the organizers of the Winfield Electric Welding Machine Co. He will still act in a consulting capacity for the former company. A. E. Hackett, who has been connected with the engineering and sales departments of the Winfield Electric Welding Machine Co., will be secretary, and have direct supervision of the sales. J. H. Ewalt, formerly treasurer and purchasing agent of the Winfield Mfg. Co., will be treasurer.

A card system for coal distribution at Youngstown, Ohio, has been worked out and will be under the general direction of the coal committee of the Chamber of Commerce, of which W. P. Arms is chairman. The coal shortage there has become so serious that a distribution system is imperative. Only one ton of coal will be given to a family at one time.

TO REGULATE TIN IMPORTS

American Iron and Steel Institute Will Act as Consignee

Through its committee on steel and steel products and the sub-committee on pig tin of which John Hughes is chairman, the American Iron and Steel Institute issued a bulletin Nov. 22 giving rules and regulations covering the importation of pig tin, chloride of tin and tin ore to the United States, as approved by the War Trade Board Nov. 16. The Government has requested the institute to act as consignee of these importations and they will be released only to approved recipients under the conditions set forth in the bulletin. The institute undertakes this work at the request also of consumers, jobbers, importers and dealers, who desire to avoid interruptions of their business.

The institute agrees to receive applications for tin, to transmit the approvals, by cable if necessary, to representatives in London, so that they may co-operate in obtaining export license from foreign countries, if necessary, and the institute also agrees to supervise importations and sales in the United States. Associated with Mr. Hughes on the committee are E. R. Crawford, John A. Fry, A. B. Hall and Theodore Pratt.

In connection with the bulletin referred to the American Iron and Steel Institute has sent out various forms, including importing consumer's guarantee, importer's and consumer's guarantee combined, importer's and stock or jobber's guarantee combined, jobber's monthly statement of sales, and application for approval as recipient of tin.

High-Manganese Pig Iron in the Open Hearth

In U. S. Geological Survey Bulletin 666-EE on Manganiferous Iron Ores, E. C. Harder gives complete data on the occurrence, volume and composition of these ores in the United States. Discussing the various ways in which such ores may be utilized, he says:

It has been suggested that by methods of concentration, resulting in the elimination of iron, silica or other constituents, a product high in manganese might be derived from them. Such concentration has been attempted locally but with very little success, owing mainly to the intimate mixture which manganese generally forms with associated materials.

The steelmaking practice might be changed so that more spiegeleisen and less ferromanganese would be used for deoxidizing. By the addition of small quantities of high-grade manganese ore much of the manganiferous iron ore could be used in the manufacture of spiegeleisen.

The most effective solution, however, seems to be to so change the practice in the manufacture of basic open-hearth steel as to make possible the use of high-manganese pig iron. Experimentation along this line is extremely desirable. The successful application of such a change would make large reserves of manganiferous iron ore commercially available and would greatly decrease the quantity of high-grade manganese ore consumed.

German preparations for trade after the war are being scrutinized carefully by experts in the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the recent important report on the subject of "German Foreign-Trade Organization" by Chauncey D. Snow has established a new sales record for Government trade reports. The bureau now plans to get out a supplementary bulletin on German trade and preparations for the commercial future about the first of the year, and further supplements as rapidly as important additional information is received.

Some investigations in arc welding are to be discussed at a meeting of the Philadelphia Section of the Association of Iron and Steel Electrical Engineers at the Majestic Hotel, Philadelphia, Saturday evening, Dec. 1, by O. H. Eschholz, research division, engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FILL IN, CUT OFF AND MAIL THIS SLIP

Volunteer Department, 119 D Street, N. E., Washington, D. C.

I desire to enlist, as a skilled workman, in the Aviation Section of the Signal Corps.

Name ..... Age.....

Address .....

At present employed with.....

.....

Trade .....No. years in trade.....

Machinery Markets and News of the Works

NOVEMBER A BUSY MONTH

Large Volume of Orders Has Been Placed

Government Trying to Increase Production of Large Tools—Contracts Being Placed for French Airplane Engines

November has been one of the most active months of the year in the machinery and machine-tool trade. Orders have been placed quietly, with fewer lists being issued, but the aggregate in some lines of tools, particularly those for making guns, shells and other ordnance equipment, has been tremendous. As an example of the size of many orders placed, a Rochester, N. Y., company received a single contract for 102 lathes, costing about $1,000,000.

Machine-tool market reports this week reflect several interesting developments. More is heard of the effort of the Government to increase production, particularly of large tools for gun work, and it is learned that the Otis Elevator Co. is one of the concerns figuring with the Government on building large tools. The Niles-Bement-Pond Co. will build a new plant on a 50-acre site just purchased near Kearny, N. J., to build large tools and cranes.

The program of the Government in curtailing wherever possible the manufacture of luxuries and utilizing the plant equipment and labor for war work is indicated by the placing of a munitions contract with the Victor Talking Machine Co., Camden, N. J. The manner in which the automobile industry will be utilized is shown by the recent contract given to the Ford Motor Co., Detroit, for airplane engines. The Atwater Kent Mfg. Works, Philadelphia, manufacturer of ignition systems for automobiles, is expected to devote its large new plant to some kind of war equipment.

Restriction on exports serves to emphasize the great need of certain tools in this country. These tools are on what is known as the conserved list and their exportation is forbidden except under the most unusual circumstances. Even our Allies must prove their absolute need of them to obtain shipments. The French Government has adopted a plan of giving certificates to its manufacturers, indicating that the tools are needed for urgent war work.

Contracts are being placed in this country for the manufacture of French and English airplane engines. The Rutenber Motor Co., Marion, Ind., bought tools in New York last week for work on Renault motors. It is understood that Gnome and Rolls-Royce motors will also be made here. The Simplex Automobile Co., New Brunswick, N. J., is already at work on Hispano-Suiza motors. The Aircraft Production Board is said to have finally decided not to put all of its trust in the Liberty motor, but to use the motors which the French and English have found by experience to be successful. Reports that the Liberty motor is not a success are denied in Washington and no one claims it is a failure, but it is learned unofficially that the motor will be used for scout duty and the French and English motors for battle 'planes. The Government has taken over the plant and equipment of the General Vehicle Co., Long Island City, N. Y., and it is understood will use it as an experimental shop for airplane engines.

Buying of machine tools in the Eastern market continues active. In New York the largest buyer is the International Arms & Fuse Corporation, Bloomfield, N. J., which has a 6-in. shell contract. The lathes it will need total nearly 600. The American Can Co. has been buying for new machine shops in Newark, N. J. The Ford Motor Co., Detroit, has commandeered 20 tools in New York. The Standard Aero Corporation, Elizabethport, N. J., is buying. Other purchasers are the H. E. Boucher Mfg. Co., New York, and the Davis-Bournonville Co., Jersey City, N. J. The Bayles Shipyards, Inc., Port Jefferson, N. Y., has issued a small list of plate and angle shop machines it will buy. The Federal Shipbuilding Co. has issued another list of 10 cranes.

In Philadelphia the American International Shipbuilding Corporation and the Baldwin Locomotive Works continue large buyers. The latter has closed with the Pawling & Harnischfeger Co. and the Shepard Electric Crane & Hoist Co. for 20 cranes, at a total cost of about $900,000. The American International Shipbuilding Corporation bought 45 hoists from the Shepard Electric Crane & Hoist Co.

Miscellaneous machine-tool and crane orders are reported in the local market reports.

The Rock Island continues to buy in the Chicago market for its gun carriage shop. The Nordyke & Marmon Co., Indianapolis, Ind., has placed orders for additional turret lathes for airplane engine work. The Holt Mfg. Co., Peoria, Ill., has not placed all of its orders for its new tractor plant addition. The Four Lakes Ordnance Co., Madison, Wis., continues to buy for gun manufacture. Westinghouse Church Kerr & Co., New York, have bought a 10-ton and a 15-ton crane for the Hydraulic Pressed Steel Co., Cleveland, from the Abell-Howe Co., Chicago. Industrial expansion in the Chicago district continues. Large additions to the plant of the Standard Steel Car Co., Hammond, Ind., will be built for building cars, and 10,000 more men will be employed.

In Cleveland the principal buying has been for airplane engine and shell work and for the manufacture of equipment for the new merchant fleet. Among the large buyers are Dodge Bros., Detroit, and the Ford Motor Co., Detroit, and there are other large inquiries for Government work.

Cincinnati builders and dealers anticipate a list from the Smith-Form-a-Truck Co., Chicago. It is reported that this company will engage extensively in the manufacture of munitions. Canadian companies are also expected to require new lathes for shell contracts.

War contracts placed in Detroit are estimated to total about $500,000,000. A large part of the contracts have been placed with automobile concerns.

In New England there is a large demand from shipyards and munition plants. The S. A. Woods Co., Boston, has taken a contract for bombs for trench mortars and is in the market for a large list of tools.

New York

NEW YORK, Nov. 27.

One of the largest purchasers of machine tools in the East this week is the International Arms & Fuse Corporation, Bloomfield, N. J., which is buying for a 6-in. shell contract. Its requirements of lathes are double those mentioned last week, numbering about 350 26-in. and more than 200 18-in. Turret lathes and other tools have also been bought in large quantities. The American Can Co., New York, will consolidate all of its machine shops in three new buildings to be constructed in Newark, N. J., contracts for which have been let. Purchases of the major part of the new equipment have been made.

A development that was of considerable interest to machine-tool sellers was the transfer of the plant and equipment of the General Vehicle Co., Long Island City, N. Y., to the United States Government for a consideration said to be $2,500,000. The General Vehicle Co. had been figuring on buying a large number of machine tools for building Gnome motors, but its contract has been held up for many weeks. Whether the Government will buy new equipment for the plant has not yet been made known. The Ford Motor Co., Detroit, has been obtaining some tools in New York for building Liberty motors. About 20 tools, which were held here in export warehouses, were commandeered. The Standard Aero Corporation is buying tools for its new plant at Elizabethport, N. J. Another interesting development of the airplane program is the placing of contracts with American manufacturers for French motors. The Rutenber Motor Co., Marion, Ind., has received an order for Renault motors and will begin manufacturing them about Jan. 1. Through the J. G. White Engineering Corporation this company ordered new equipment in New York last week.

As an example of the large size of some of the individual machine-tool orders being placed these days, it is interesting to note that the Bridgeford Machine Tool Works, Rochester, N. Y., recently received a contract for 102 large lathes for gun work at the Watertown Arsenal from the Stone & Webster Engineering Corporation. The total cost of the lathes is about $1,000,000.

The H. E. Boucher Mfg. Co., New York, has bought a few tools for Government work. The Davis-Bournonville Co., Jersey City, N. J., has also bought a number of tools.

The Government is making efforts to increase the production of large tools, particularly those required for gun work, and several companies which have the equipment necessary for such work may receive contracts. The Otis Elevator Co., which made large lathes for the British Government early in the war, is reported to be about to close a contract with this Government to build large tools. The Niles-Bement-Pond Co., New York, has purchased 50 acres at Kearny, N. J., and will put up a new plant for building large tools and cranes.

The Bayles Shipyards, Inc., Port Jefferson, Long Island, has issued a list of about a dozen machines wanted for a plate and angle shop. The Federal Shipbuilding Co. has issued a second list of cranes for its plate and angle shop and boiler shop. The new list asks bids on four 10-ton, double-trolley cranes, 60-ft. span; four 20-ton, single-trolley, 45-ft. span, and two 35-ton, single-trolley, 28-ft. span.

Other activities in the crane market are as follows: Horace A. Staples, engineer, 103 Park Avenue, New York, is in the market for five 3-ton cranes for a brass foundry. Okura & Co., New York, want a 5-ton and a 20-ton crane for export to Japan. The Lehigh Valley Railroad Co. is in the market for five gantry cranes. The Union Pacific Railroad Co. has ordered one 25-ton and one 15-ton crane for its Pocatello, Idaho, shops. The American Can Co. has received bids on a 10-ton and a 20-ton crane for its new machine shops in Newark, N. J. The Liberty Ordnance Co., successor to the Bridgeport Projectile Co., Bridgeport, Conn., has bought a 10-ton crane. The Erie Steel Construction Co., Erie, Pa., has received a contract for a number of cranes for the Watertown Arsenal and several small cranes for the Blake & Knowles plant of the Worthington Pump & Machinery Corporation. Some of the companies which have lately entered the crane industry are offering fairly early deliveries, from one to three months. On non-Government work about six-month deliveries are generally quoted.

Export trade in machine tools is being restricted in various ways. The Exports Administrative Board in Washington, of which J. R. Vandyck of the Vandyck-Churchill Co., New York, is machinery expert, is scrutinizing all applications for export, even to our Allies, very carefully. The French Government now issues certificates to its manufacturers who need machines. It is understood that these certificates are being issued only when the tools are greatly needed in France for war work.

The Washburn Wire Co., foot 118th Street, New York, is having plans prepared for rebuilding its works recently destroyed by fire. B. and J. P. Walther, 147 East 125th Street, are the architects.

The Militer Corporation, New York, has been incorporated with a capital of $1,000,000 to manufacture guns, airplanes and other products. E. McM. Mills, A. W. Britton and G. V. Reilly, 65 Cedar Street, are the incorporators.

The Bull's Eye Rubber Co., New York, has been incorporated with a capital of $250,000 to manufacture rubber specialties. A. C. Squires, E. C. Tengzelius and J. Futoransky, 149 Broadway, are the incorporators.

Marion T. Brockway, Long Island City, N. Y., has acquired the six-story factory now being erected on Jackson Avenue, near Skillman Place, on property about 350 x 500 ft., for the establishment of a plant to manufacture automobile accessories.

The Cross Metal Products Corporation, New York, has been incorporated with an active capital of $155,000 to manufacture metal snap fasteners, etc. The incorporators are R. Hartmann and S. Schwartz, 165 Broadway.

The Tock Screw Machine Products Corporation, Eighth Street, Long Island City, N. Y., has increased its capital from $50,000 to $100,000.

The New York Rotary Motor Co., New York, has been incorporated with a capital of $1,700,000 to manufacture motors, etc. A. M. Sullivan, H. and S. S. Meyers, 60 Wall Street, are the incorporators.

The Roberts Numbering Machine Co., 706 Jamaica Avenue, Brooklyn, is having plans prepared for the construction of a two and one-half-story addition to its plant to cost about $30,000.

The Liberty Equipment Corporation, New York, has been incorporated with a capital of $10,000 to manufacture equipment and appliances for machine shops. The incorporators are F. Leder, R. R. Mitchell and O. J. Korb, 27 Cedar Street.

The Price Engine Corporation, New York, has been incorporated with a capital of $1,000,000 to manufacture engines. G. F. Jebbett, J. M. Harding and J. T. Crowley, 81 Morton Street, are the incorporators.

The Electric Welding Co., 801 Vernon Avenue, Brooklyn, has had plans prepared for the erection of a new one-story machine shop, about 35 x 70 ft., at the foot of Court Street.

The Automobile Tire Co., 1625 Broadway, New York, manufacturer of tires, has increased its capital from $10,000 to $500,000.

The Franklin Railway Supply Co., New York, has been incorporated with a capital of $50,000 to manufacture railroad specialties. H. F. Ball, F. R. Series and C. L. Winey, 181 Amherst Street, Brooklyn, are the incorporators.

The Oneida Motor Truck Co., New York, has been incorporated with a capital of $10,000 to manufacture motor trucks. W. L. Fuhrer, C. D. W. Rogers and J. H. Boyle, 502 West 180th Street, are the incorporators.

The Corning Foundry, Corning, N. Y., has been incorporated with a capital of $100,000. S. E. Flitner, W. M. Gurnsey and B. W. Wellington, Corning, are the incorporators.

The Bossert Co., Hickory Street, Utica, N. Y., manufacturer of stamped metal goods, electrical switch boxes, etc., will build a one-story addition about 40 x 70 ft.

The Threadless Pipe & Coupling Co., Cohoes, N. Y., has been incorporated with a nominal capital of $5,000 to manufacture pipe, couplings, etc. T. H. Burke, W. and W. J. Beattie, Cohoes, are the incorporators.

Firth & Marshall, New York, have been incorporated with a capital of $100,000 to manufacture electrical appliances. J. Firth, C. Marshall and H. Freece, 35 Wall Street, are the incorporators.

The Howes Co., Silver Creek, N. Y., has been incorporated with a capital of $250,000 to manufacture machinery and tools. M. L., A. C. and M. A. Barbau are the incorporators.

The National Pneumatic Co., 50 Church Street, New York, has purchased property on New Brunswick Avenue, Rahway, N. J., and plans the construction of a new plant.

The Norton Shipbuilding Co., Bloomfield, N. J., has been incorporated with a capital of $250,000. Elmer E. Wigg, Bloomfield,; Alfred E. Norton and Carl Nordstrom, New York, are the incorporators.

The International Arms & Fuse Corporation, Bloomfield, N. J., is planning for the erection of a 600-ft. addition to its works, fronting on the tracks of the Erie Railroad.

A. H. Bryant, associated with the Simmons Hardware Co., 17 Battery Place, New York, will build a new two-story, reinforced-concrete plant, about 80 x 120 ft., at Bloomfield, N. J.

Burlington, N. J., has had plans prepared for a new municipal power plant and will call for bids for construction early in December. Haines & Sherman, 415 Market Street, Camden, are the engineers.

The American Auto Top Co., Morristown, N. J., recently organized, has acquired property at Ford and Franklin avenues for the establishment of a factory for the manufacture of automobile seats, tops, etc. George H. Quennard heads the company.

The Waclark Wire Co., Bayway Street, Elizabeth, N. J., manufacturer of wire and cables, has awarded a contract for the erection of a two-story and basement addition, 105 x 180 ft., to its plant at Bayway and South Front streets to cost about $100,000.

The American Stove Co., 209 West Forty-third Street, New York, a New Jersey corporation, has increased its capital from $7,000,000 to $10,000,000.

Brandis & Sons, Inc., Jersey City, N. J., has been incorporated with a capital of $100,000 to manufacture precision instruments. C. H. Jarvis, H. A. Black and J. R. Turner are the incorporators.

The American Can Co., 449 Communipaw Avenue, Jersey City, will erect a one-story addition to its plant.

The Drop Forging Co. of New York, 301 Westside Avenue, Jersey City, will build a one-story addition to its plant.

The Central Railroad of New Jersey, Jersey City, is considering the erection of a new one-story power plant at its local terminal to cost about $150,000. Headquarters of the company are at 143 Liberty Street, New York.

The Otto Snap Fastener Co., Newark, N. J., has been incorporated to manufacture metal snap fasteners, etc. George B. Brandt, John Kovats and Harry M. Salyer are the incorporators.

The Meco Engineering Co., 800 Broad Street, Newark, has been organized to manufacture machinery. Irving Hirsch, 354 Livingston Street, heads the company.

The C. F. Massey Co., Newark, manufacturer of concrete products, will build two one-story additions to its plant, 80 x 216 ft. and 40 x 150 ft., respectively, to cost $15,000. Plans have been filed.

Buffalo

BUFFALO, Nov. 26.

The Automatic Transportation Co., Buffalo, has let contract for an additional machine shop, 55 x 150 ft., two stories, at its plant at Main Street and the Erie Railroad.

The Atlas Steel Casting Co., Buffalo, George H. Chisholm, president, will add a shop and finishing building, 40 x 96 ft., to its plant at Elmwood Avenue and the Erie Railroad.

The Muller-Ulrich Machine & Tool Co., Buffalo, has been incorporated with a capital of $20,000. F. and A. Muller and C. Ulrich are the directors.

The United States Lens Co., Geneva, N. Y., is taking bids for an addition to its melting department. It has also let contract for an addition, 65 x 140 ft., to cost $30,000.

The Kellogg Structural Steel Co., Buffalo, has let contract for an addition to its fabricating shop, 55 x 150 ft., at the New York Central Railroad and Stone Street.

The Wilson & Greene Motor Co., Inc., Syracuse, N. Y., has been incorporated with a capitalization of $50,000 to manufacture automobiles. The incorporators are G. M. Wilson, O. H. Green and L. Will, Syracuse.

The foundry building for the American Radiator Co., Buffalo, at its Pierce plant, will be 150 x 200 ft. and cost $150,000.

The New Idea Double Tire Co., Syracuse, H. P. Kupperman, president, 261 West Onondaga Street, is having plans prepared for a three-story factory on West Taylor Street at an estimated cost of $25,000.

The Cousins & Son Boiler Works, 74 Wabash Avenue, Buffalo, manufacturer of boilers, stacks and tanks, will erect a boiler shop, 80 x 120 ft., at Hamburgh Turnpike, Childs Street and the Buffalo Creek Railroad.

Watertown, N. Y., is having preliminary plans prepared by the S. M. Greene Co., architect and engineer, Springfield, Mass., for a power plant, to be constructed at an estimated cost of $300,000. J. W. Knowlton is president of the water board.

The Atwood Phototaker Co., Inc., Albany, has been incorporated with a capital stock of $300,000 to manufacture a device for cameras. H. C. Atwood, Ardmore, Okla.; J. A. O'Connor, 131 Lancaster Street, and J. L. Mallett, 916 Madison Avenue, Albany, are the incorporators.

The Simons Mfg. Co., Lockport, N. Y., manufacturer of saws, is adding a one-story building, 50 x 150 ft., to its plant at Ohio Street and the New York Central Railroad.

The Bossert Corporation, Utica, N. Y., Frank Norman, president, 1021 Hickory Street, is having plans prepared for a tool building, 40 x 70 ft., and a boiler house, 20 x 80 ft.

W. Ralston & Co., Ltd., Niagara Falls, N. Y., will build an addition, 36 x 120 ft., to its plant on Whirlpool Avenue.

The board of water supply, Olean, N. Y., William Sheehan, chairman, will receive bids until Dec. 5 for a filtration plant, including pump house and equipment with a daily capacity of 2,500,000 gal., estimated to cost $75,000.

The O'Neil Iron Works, Perry Street, Buffalo, recently incorporated with a capital of $400,000 to manufacture sugar mill machinery, has increased its capital to $500,000.

The New Idea Double Tire Co., 261 West Onondaga Street, Syracuse, N. Y., is planning for the erection of a three-story addition to its plant, about 50 x 150 ft., on West Taylor Street, to cost $25,000.

The Bay City Forge Co., Cranberry Street, Erie, Pa., will build a new one-story machine shop, about 67 x 176 ft., at Cranberry and West Eighteenth streets, to cost $30,000.

The Bowen Products Corporation, Auburn, N. Y., has been incorporated with a capital of $2,500,000 to manufacture engines, motors, etc. A. F. Dillman, E. T. Williams and W. B. Reynolds, 240 West 102d Street, New York, are the incorporators.

The Willys-Morrow Co., Elmira, N. Y., manufacturer of airplanes, has had plans prepared for the erection of a one-story addition, to cost about $20,000.

New England

BOSTON, Nov. 26

New England machine shops continue to participate in a large measure in orders being placed by all sections of the country for machine tools, special machines and tools and attachments of all kinds for war production. There is considerably greater activity in the market for the smaller sizes of machine tools. Orders from Government ship and munitions plants continue the leading feature of the local demand, but there are many orders of one or two machines each from industries in all parts of New England.

Makers of tools, gages and radio apparatus are active purchasers. The S. A. Woods Co., Boston, which has been particularly successful in shell making, has taken on a large order for bombs for trench mortars and is in the market for a large list of tools for this work. Well authenticated reports indicate that several plants which have never made munitions will soon be in the market for equipment to fill large Government contracts which they are undertaking.

A large majority of the long-established machine tool plants are accepting virtually no orders except for munitions and ship work and are working closely with the Priority Board. Several are making plans to greatly increase their present output. The business being offered is at least three times the present production and it is expected that, with Government assistance on the labor problem, the industry will enter into the new year at a greatly accelerated pace.

The Terry Steam Turbine Co., Hartford, Conn., is to erect a one-story addition, 100 x 108 ft.

The American Broaching Machine Co., Marlboro, Mass., has been incorporated with authorized capital stock of $60,000 by Francis Lapointe, and others.

The Rhode Island Tool Co., Providence, R. I., is to build an addition, 32 x 90 ft., one story, and an annealing shop, 45 x 140 ft.

The Boston Stove Foundry Co., Boston, has been incorporated with authorized capital stock of $50,000. Joseph Lanes, Dorchester, is president, and Isaac Bachrach, Chelsea, treasurer.

The B. F. Sturtevant Co., Readville, Mass., has begun work on a one-story addition containing 20,000 sq. ft.

The Safety Ventilating Lock Co., Norwich, Conn., has been incorporated with authorized capital stock of $200,000

and will begin business with capital of $100,000. The incorporators are David D., Frank A. and Samuel G. Wellman.

The Mattatuck Mfg. Co., Waterbury, Conn., has had plans drawn for an addition, 60 x 200 ft., four stories.

The H. A. Matthews Mfg. Co., Seymour, Conn., has increased its capital stock from $300,000 to $400,000.

The Naugatuck Valley Crucible Co., Huntington, Conn., has been organized with $50,000 capital. D. N. Clark is president; W. H. Carpenter, vice-president; Ray E. Carpenter, secretary, and O. F. G. Boeker, treasurer.

The International Machine Co., Lowell, Mass., has been incorporated with authorized capital stock of $36,000. Wheaton Kittredge is president and Ira Harris, 62 Lincoln Street, treasurer.

The H. & H. Foundry Co., Stamford, Conn., has been organized with $15,000 capital. Benjamin Harris is president; John Hanson, vice-president; and Nickolas Rominello, treasurer.

The E. Horton & Son Co., Windsor Locks, Conn., manufacturer of lathe chucks and castings, is building a two-story addition, about 40 x 50 ft.

The Bureau of Yards and Docks, Washington, D. C., has awarded a contract to Westinghouse Church Kerr & Co., New York, for the erection of a one-story power plant at Newport, R. I., to cost $900,000.

Philadelphia

PHILADELPHIA, Nov. 27.

As showing the plans of the War Industries Board to organize for war work the factories of the country which are engaged on so-called non-essentials, it is interesting to note that the Victor Talking Machine Co., Camden, N. J., has been awarded a Government contract for war material. It is understood that only a part of the talking machine plant will be devoted to war work for the present. New equipment was purchased some weeks ago. The organization of automobile and accessory plants for war work is also indicated by the report that the Atwater Kent Mfg. Works, Philadelphia, maker of ignition systems for automobiles, is ready to devote its large plant to the manufacture of war material as soon as a Government contract is signed. New machine tools will be purchased, tentative negotiations now being made.

The Government is recognizing the railroads' need of locomotives and is giving A1 priority to equipment for the new erecting shop of the Baldwin Locomotive Works. A large gain in production has already been made this month. It is reported that the first week of the month 70 locomotives were built, the next week the record was 78 and 100 a week will now be the production. With the new plant, which will be ready early next year, this capacity will be considerably increased. Orders were placed last week with the Pawling & Harnischfeger Co. and the Shepard Electric Crane & Hoist Co. for 20 large cranes for the new shop. The total cost is approximately $900,000. There were four 150-ton, four 100-ton, two 70-ton, two 50-ton and eight 20-ton.

It is also unofficially reported that the Government is urging the railroads to increase their facilities wherever possible for the manufacture of locomotives and cars. The Pennsylvania Railroad Co. has awarded contracts for extensions at its Columbus, Ohio, shops. Three new buildings will be erected at a cost of about $1,000,000. Buying of equipment will be done in Pittsburgh. Plans for increasing the equipment at the Altoona, Pa., shops are also said to be under consideration.

Although no cancellation of orders has been reported, it is said here that the plans of the Baldwin Locomotive Works for a shop at Vladivostock, Siberia, for the Russian railroads has been temporarily held up. At last report the experts sent from the Baldwin shops had not sailed from a Pacific port, and possibly will not do so until a more stable form of government is obtained in Russia.

Shipbuilders continue to buy, but are having difficulties in getting equipment as quickly as required. The American International Shipbuilding Corporation has placed an order with the Shepard Electric Crane & Hoist Co. for 45 hoists for its shops at Hog Island. It has also issued a small list of tools needed for a machine shop. Equipment is being bought for one shop at a time. The Clinton Shipbuilding & Repair Co., Philadelphia, is making numerous additions and improvements for the building of steel barges. A small quantity of equipment will be purchased.

The Tioga Steel & Iron Co., subsidiary of the Taylor-Wharton Iron & Steel Co., has been buying additional large tools for its gun machining shop and smaller tools for a tool room. The Frankford Arsenal continues to buy miscellaneous tools, mostly for fuse work.

The Philadelphia & Reading Railroad will build a new machine shop at Erie Avenue and Tulip Street, for which equipment has been ordered. The Tioga Machine Co. will build a machine-shop addition at Ontario and Twenty-third streets, and will need a few tools. The New York Shipbuilding Corporation has bought equipment for a forge shop addition.

The Carlson-Wenstrom Co., manufacturer of ball bearings, expects to build a new plant at East Stroudsburg, Pa., for the fulfilling of a war contract. The Merchant & Evans Co., Philadelphia, has bought a few new tools for the manufacture of universal joints for automobiles. The Arguto Oilless Bearing Co., which had plans prepared for the erection of a plant at Wayne Junction, Philadelphia, for manufacturing a newly patented ignition system, announces that nothing will be done until after normal conditions return. The J. G. Brill Co., Philadelphia, is manufacturing airplane engines for the Government.

The Lykens Valley Fuel Co., Reading, Pa., has been incorporated with a capital of $10,000 to build a plant at Williamstown for the manufacture of coal briquettes. John J. Knoll, Charles E. Kirlin and Donald B. Heilman are the incorporators.

The H. Belfield Co., 435 North Broad Street, Philadelphia, manufacturer of plumbing supplies, steam fittings, etc., has awarded a contract for the construction of additions to its plant to cost $100,000. The structures will comprise a one-story foundry, 100 x 280 ft.; five-story manufacturing plant, 100 x 280 ft.; one-story power plant; and one-story warehouse, 100 x 280 ft. The William Steele & Sons Co., 30 South Fifteenth Street, is the contractor.

The Acme Steel Products Co., Philadelphia, has been incorporated with a capital of $5,000 to manufacture steel and iron specialties. A. L. Wurster, Haddon Heights, N. J., heads the company.

Halstead & Co., 1129 Cherry Street, Philadelphia, operated by the estate of L. R. Halstead, manufacturers of brass and bronze products, have filed plans for improvements in their brass foundry to cost about $3,000.

The J. G. Brill Co., Sixty-second Street and Woodland Avenue, Philadelphia, has commenced the manufacture of the new Liberty motors for airplane service for the Government at its works. Considerable new machinery has recently been installed.

The Philadelphia & Reading Railroad, Reading Terminal, Philadelphia, has taken bids for the erection of a new 16-stall engine house, 200 ft. in diameter, and one-story machine shop, 156 x 220 ft., at its Erie Avenue yards. S. T. Wagner is engineer.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, has purchased property, about 143 x 143 ft., adjoining its works at Adams and Thompson streets, for extensions.

The Hulton Printing Processing & Dyeing Co., 3851 Frankford Avenue, Philadelphia, has awarded a contract for the erection of a new one-story machine shop, about 72 x 186 ft., to cost $21,000.

The Stokes Rubber Co., Trenton, N. J., will erect a one-story addition, 22 x 65 ft., on Taylor Street.

The Columbia Bronze Foundry Co., 529 Columbia Avenue, Camden, N. J., has increased its capital from $10,000 to $200,000.

The Schwab-Kenemuth Co., Bradford, Pa., has been incorporated with a capital of $15,000 to manufacture automobiles. John S. Kenemuth, Bradford, is the principal incorporator.

The Calley Iron Works, West Street, Williamsport, Pa., is having plans prepared for the erection of a one-story addition. W. J. Riley is president.

The Rowe Motor Mfg. Co., Downingtown, Pa., manufacturer of motor trucks, is having plans prepared for the erection of a one-story building, 120 x 200 ft., on property recently acquired at Lancaster, to form the initial unit of its proposed new plant. Samuel J. Rowe, president.

The Holgate Brothers Co., Kane, Pa., operating a woodturning works at Biddle and Welch streets, will build a two-story addition, about 35 x 165 ft., to cost $18,000. W. H. Davis is general manager.

The Reifft & Nestor Co., Lykens, Pa., has been incorporated with a capital of $140,000 to manufacture taps and dies. The officials of the new company are operating a local works under the name of Nestor & Reifft, for the manufacture of machine tools. The incorporators are John S. Reifft, J. P. Nestor and B. M. Kline.

Pettinos Bros., Bethlehem, Pa., manufacturers of graphite products, have acquired property adjoining their works for extensions.

The Allentown Standard Mfg. Co., Allentown, Pa., has completed the erection of its new plant, which will be devoted to manufacturing sheet iron and metal ware. Henry J. Franklin is president and Samuel I. Perlman, secretary and treasurer.

Spang & Co., Etna Street, Butler, Pa., manufacturers of oil well supplies, will build a one and two-story addition to their plant, about 170 x 250 ft., to cost $150,000.

W. L. Browning, Wayne, Pa., has acquired the machine shop of Lownes & Butler, Washington Street, near DeKalb Street, Norristown, Pa., and is planning improvements.

The National Carbon Co., Cleveland, has acquired property at Scranton, Pa., and contemplates the erection of new works.

The Guerber Engineering Co., Bethlehem, Pa., manufacturer of structural shapes and railroad specialties, has increased the capacity of its plant about 50 per cent. A considerable portion of the works is now being devoted to the manufacture of iron and steel products for the Government.

Baltimore

BALTIMORE, Nov. 26.

The Baltimore Dry Dock & Shipbuilding Co., Baltimore, will erect a boiler house, pump room and other buildings at a cost of about $25,000.

The Federal Electric Welding Co., foot of Thames Street, Baltimore, will build a one-story repair shop, 18 x 36 ft.

The Pyrites Co., Ltd., Wilmington, Del., will rebuild the factories recently destroyed by fire.

The American Chain Co. of Virginia, Norfolk, Va., recently incorporated, has awarded a contract for its new works, to consist of two initial buildings, one-story, 90 x 560 ft. and 60 x 300 ft. respectively. It is a subsidiary of the American Chain Co., Bridgeport, Conn.

Cahill & Co., Second and French streets, Wilmington, Del., are taking bids for the erection of a two-story building to cost about $30,000, to replace their carriage and automobile factory recently destroyed by fire.

Reus Brothers, 146-50 West Mount Royal Avenue, Baltimore, have acquired property adjoining their plant for the construction of a new machine shop. A new ignition department for repair and maintenance work for automobile systems will also be installed.

The F. X. Hooper Mfg. Co., Glenarm, Md., manufacturer of rotary printing presses, is planning to immediately rebuild its plant recently destroyed by fire.

The Piot-Rola Mfg. Corporation, Wilmington, Del., has been incorporated with a capital of $1,500,000 to manufacture motion picture machinery. John J. Jolls and K. E. Longfield, Wilmington, are the incorporators.

The Bureau of Yards and Docks, Washington, D. C., has taken bids for the erection of a new one-story foundry, 54 x 275 ft., and a five-story optical works, 35 x 60 ft., at the Washington Navy Yard.

The Louisana Shipbuilding Co., Richmond, Va., has been incorporated with a capital of $1,500,000. James Mullen and Cyrus W. Beale, Richmond, are the incorporators.

Chicago

CHICAGO, Nov. 26.

The Rock Island Arsenal has completed distributing orders for the huge number of machine tools it requires for the manufacture of French 75 mm. gun carriages, practically all of the dealers and district sales offices getting their share. No new lists of notable size have made their appearance in the past week, but there are still many important orders pending against old lists. The Nordyke & Marmon Co., Indianapolis, has placed additional orders for turret lathes. The Holt Mfg. Co., Peoria, Ill., has not yet placed all of its orders. The Four Lakes Ordnance Co., Madison, Wis., continues to buy to round out its equipment.

In a number of cases conflict has arisen as to which deliveries should precede where buyers have class A priority certificates, and in some cases the expected order of delivery has been reversed. So many class A certificates are now extant that the broad classification does not mean anything, and sub-classifications must rule. In several instances industrial buyers have cheerfully consented to a long postponement of delivery when they learned that the Government needed the tools. Dealers are not taking chances and will not deliver a machine until they receive specific Government authority. One company is advising all customers, to whom they have sold machines for future delivery, to obtain priority certificates regardless of what class they may come under. The same seller is also inserting in contracts a clause that the tools purchased shall not be resold, this proviso being directed against speculators.

Through the Abell-Howe Co., Chicago, Westinghouse Church Kerr & Co. have purchased a 10-ton and a 15-ton crane for the Hydraulic Pressed Steel Co., Cleveland. The Abell-Howe Co. also has sold to the International Shipbuilding Co., Orange, Tex., three 3-ton American electric hoists.

The George A. Fuller Co. has been awarded the general contract for the eight-story concrete factory, 100 x 100 ft., to be erected at West Kinzie and Franklin streets, Chicago, for the Union Special Machine Co., at an estimated cost of $125,000.

The general contract for a one-story factory at 3239 and 3241 South La Salle Street, Chicago, for the International Leather & Belting Co. has been awarded to Jacob Rodatz, 209 South La Salle Street, Chicago. It will cost $20,000.

Marshall Field & Co., Chicago, will erect a garage covering a city block, 238 x 354 ft. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, Chicago, are taking bids for the structure, which will be one and two stories and cost about $400,000.

The plant which the American Wire Fabrics Co. will build just south of Blue Island, Ill., on a site of nine acres recently purchased, will cost $250,000. Four one-story buildings are to be erected.

It is reported that extensive additions are to be made to the plant of the Standard Steel Car Co., Hammond, Ind., to facilitate handling a large war order for the execution of which 10,000 additional men will be employed.

Sears, Roebuck & Co., Chicago, have purchased 280 acres at Wood River, Ill., where it is said a plant will be erected for the manufacture of tractors, stoves and other products.

The V. A. Smith Co., Chicago, maker of boilers and furnaces, has purchased the Maple City Foundry, Monmouth, Ill., which will be enlarged for the manufacture of their products. W. C. Talbot, who sold the foundry, will remain as manager.

The Keystone Steel & Wire Co., Peoria, has completed the steel work of a large machine shop for which the equipment has been provided, either by recent purchases, or transferring machinery from other parts of the plant.

The Ogden Mfg. Co., Ogden, Iowa, has been incorporated with a capital stock of $10,000 to manufacture automobile and truck chains and anti-skid devices. The officers are O. M. Needham, president; C. O. Nelson, secretary, and Orson Peterson, treasurer.

The Stutesmar Farm Tractor Co., Chicago, has been incorporated in Delaware with a capital of $100,000 to manufacture farm tractors and machinery. Frank J. Stutesmar, Cary W. Martin and George R. Walker, Chicago, are the incorporators.

The Fort Wayne Tire & Rubber Mfg. Co., Chicago, has been incorporated in Delaware with a capital of $500,000 to manufacture automobile tires and rubber products. L. E. Kraft, J. C. Brown and H. J. Karr, Chicago, are the incorporators.

Milwaukee

MILWAUKEE, Nov. 26.

Orders booked and delivered by machine tool manufacturers in this district during November are by far the largest ever known in the history of the industry. After Jan. 1 the facilities for manufacturing milling machines will be considerably enlarged by extensions to shops now under way, but the additional capacity thus available is virtually occupied by the business on hand. As practically all tools now manufactured are for Government account, machine tool builders are not seriously affected by the growing acuteness of the car shortage and congestion of freight transportation as are other manufacturers. It is noticeable that industries of a more or less non-essential type are getting along with existing facilities, and a temporary halt has been called on expansion. Essential industries, however, are filling the void thus created by pushing their extensions more rapidly.

The Harley-Davidson Motor Co., Milwaukee, manufacturer of motorcycles, engines, parts, etc., has awarded contracts for the erection of a one-story steel and brick addition, 120 x 180 ft., to its works at Thirty-eighth and Chestnut streets. It will be used as a machine shop.

The Common Council, Hartford, Wis., has engaged Andrew Martin, consulting engineer, to prepare specifications for a new pumping station and reservoir for the municipal waterworks system, at an estimated cost of $20,000. The work will be undertaken next spring.

The Eagle Mfg. Co., Appleton, Wis., manufacturer of tractors, gas engines and farm machinery, has awarded the general contract for the erection of a one-story brick, steel and concrete machine shop, 120 x 120 ft., to Greunke Bros. It will be equipped principally for tractor production and

when completed will cost about $50,000. Frank Saiberlich is president and general manager.

The Milwaukee Ice Machine Co., Milwaukee, has been incorporated with an authorized capital stock of $50,000 by Edwin Olsen, Fred Marggraff and Matthew Ferko. It intends to manufacture a new line of refrigerating machinery and equipment.

The DePere Mfg. Co., DePere, Wis., will start work Dec. 1 on the construction of fifty 200-hp. marine boilers for the Emergency Fleet Corporation, which will require a large part of the capacity of its boiler and structural shop for six months or longer. In addition, the company is working on private contracts which will keep it at maximum capacity for a long time ahead. The plant is closely affiliated with the Joliet, Ill., Bridge & Iron Co., and A. W. Woodman is president of both companies. Ward Clark is manager at DePere.

The Northern Wood Products Co., Glidden, Wis., will spend about $40,000 in the erection and equipment of additions to its hardwood products factories and power plant. W. A. Thomas is president and general manager.

The Lasure Friction Clutch Co., Watertown, Wis., has accepted contracts from gas engine manufacturers for clutch requirements during the coming year which insures capacity operation of its plant for at least eight or ten months.

The Liberty Foundry Co., Milwaukee, which has been incorporated with a capital stock of $30,000, intends to erect a brick and steel plant, 60 x 120 ft., with auxiliary buildings, in West Allis and will take bids after Dec. 1. Gerhardt W. Mockly is president and W. J. Buckley secretary. Temporary offices have been established at 867 Grant Boulevard.

William Koeck, Oshkosh, Wis., has organized the Oshkosh Auto Jack Mfg. Co. to manufacture jacks and other automobile accessories and supplies. Factory quarters have been established in the Libbey Building. For the present the castings will be purchased under contract.

The Liberty Mfg. Co., Milwaukee, has been incorporated with an authorized capital stock of $200,000 by William J. Schubert and Walter J. Raley, of the Milwaukee Auto Specialty Co., 705 Chestnut Street, and William Saddlemire, 450 Twenty-ninth Street, to manufacture automobile and motor truck parts and other supplies for manufacturers executing Government contracts. Details of the project will be announced later.

A. J. Schutte, architect, 421 Camp Building, Milwaukee, who has been preparing plans for a $30,000 motor truck factory in North Milwaukee, announces that the owners, as yet unnamed, have indefinitely postponed the project because of unfavorable conditions surrounding the building material, labor and equipment markets.

The National Auto Wheels Corporation, Wausau, Wis., has been incorporated with a capital stock of $50,000 by M. Philopp, E. J. Coerper and Robert T. Steretzky.

Detroit

DETROIT, Nov. 26.

This city is readjusting itself for what is believed will be a period of the greatest industrial activity in its history. War contracts placed by the Government approach $500,000,000. A large part of these have been placed with automobile companies which are particularly adapted for the manufacture of munitions.

In addition to the $30,000,000 contract, to handle which Dodge Bros. are building a factory, and a huge order placed for trucks and airplane engines with the Packard Motor Car Co., the Cadillac Motor Car Co. has announced the beginning of work on a second order which is said to call for millions of dollars worth of airplane engines and munitions. The Cadillac Co. has been turning out a large number of automobiles for the Government and will continue the manufacture of pleasure cars. Large metal working companies in this district are working on Government orders, and plans have been made by smaller firms by which Government contracts can be divided among them.

The Ford Motor Co. is taking on more Government work and if necessary will turn over its entire plant, employing 30,000 men, to the Government.

The American Twist Drill Co., Detroit, recently organized, has obtained the plant of the Holihan Mfg. Co., 866 West Jefferson Avenue, Detroit, and will manufacture forged high speed twist drills. Arthur C. O'Connor is president; Peter J. Hoehscheid, vice-president; John O'Connor, treasurer, and Gerald C. Hodge, secretary.

The Blood Bros. Machine Co., Allegan, Mich., has moved into a larger plant where it will employ 40 more men and machines. It manufactures universal joints for automobile trucks.

The Republic Motor Truck Co., Alma, Mich., contemplates the manufacture of 40,000 trucks during the coming year. To care for this increased production additions are under way which will increase the floor space 70,000 sq. ft.

The Solvay Process Co., Detroit, will not immediately begin work on its addition on Zug Island, where it recently purchased 1300 ft. frontage on the Detroit River.

Assets of the Detroiter Motor Car Co., Detroit, will be offered at auction Nov. 27. It is the successor of the Briggs Detroiter Co., which became insolvent three years ago.

The Chevrolet Motor Co., Flint, Mich., a subsidiary of the General Motors Co., has taken out a permit for extensions to cost $150,000. This follows a permit recently secured for additions which call for $100,000 and still further building plans costing $30,000.

The Saginaw Shipbuilding Co., Saginaw, Mich., will increase its capital from $350,000 to $500,000 and nearly double the capacity of its plant. Machinery will be installed shortly.

The F. F. Wood Motor Co., Grand Rapids, Mich., has been organized with $15,000 capital by F. F. Wood, W. L. Marsh and F. M. Todd.

The Michigan Bolt & Nut Works, Detroit, is completing an addition which will cost $100,000, being the second unit in expansion.

Dodge Bros., Detroit, will add the manufacture of trucks to their product, each to have a capacity of 1500 lb.

The Wolverine Motor Co., Kalamazoo, Mich., has increased its capital stock to $250,000 and is planning for the production of 600 automobiles the first year.

The Independent Stove Co., Owosso, Mich., has let contract for a four-story addition, 60 x 100 ft., to its plant, to be completed by Jan. 15.

C. R. Hardy, Louisville, Ky., will manufacture light vehicles and automobile parts in Grand Rapids, Mich., occupying the former plant of the Jelke-Steck Co.

Cleveland

CLEVELAND, Nov. 26.

The purchase of machinery for Government work continues at a rapid rate. The demand is largely for machines for large shells and for shipyards. Contracts for marine engines have been distributed among Ohio plants, and additional equipment is being purchased for their manufacture. Dodge Bros., Detroit, purchased a large amount of equipment the past week. A local manufacturer took an order from this firm for 30 screw machines. The Ford Motor Co. purchased some additional equipment for airplane work. Two new inquiries have come out from Ohio manufacturers for equipment for Government orders, one being for about one hundred machines, and the other for 225 machines of various types. The demand at present is mostly for large machines, including planers, radial drills, grinders, gear cutters and boring machines. Deliveries on milling machines are growing worse, and some manufacturers cannot make shipments before 1919. On lathes 20 in. and larger deliveries are tighter, and manufacturers are promising shipments from February to July.

Thirteen buildings for use for automobile truck repair sheds by the American forces in France have been fabricated by the Austin Co., Cleveland, Ohio, and were recently shipped. These are 100 x 200 ft. The company has also received a Government contract for an airplane repair shop for shipment to France, this to be 260 x 600 ft., and for an airplane and storage building, 300 x 380 ft., to be erected at Brooklyn, N. Y., for the Bureau of Yards and Docks.

The Blomquist-Eck Machine & Mfg. Co., Cleveland, will move about Dec. 1 to its new plant on East 152d Street, where a new ball bearing horizontal boring, drilling and milling machine will be manufactured. All the equipment in the plant will be motor driven.

The plants of the Bowen Mfg. Co., Auburn, N. Y.; Zerk Mfg. Co., Cleveland; Wiskley Co., Detroit, and the Canadian Wiskley Co., Windsor, Ont., have been consolidated, to be known as the Bowen Products Corporation, with a capital stock of $2,500,000. The merged plants manufacture automobile parts and are now largely engaged on Government motor truck work. The main offices will be located at Auburn. E. W. Bowen is president and George W. Severson vice-president.

The Kirk-Latty Mfg. Co., Cleveland, has placed a contract for the erection of a two-story addition 83 x 282 ft. for office and shipping purposes.

The Metalcraft Co., Cleveland, has increased its capital stock from $100,000 to $200,000 and is considering extensions.

The Davis Tool Co., Cleveland, has been incorporated with a capital stock of $50,000 by J. H. Grayson, C. C. Howard and others.

The National Carbon Co., Cleveland, has placed a contract for the erection of a two-story factory.

The American Metal Wheel Co., Toledo, and the National Wheel Co., Perrysville, Ohio, have been consolidated under the name of the American-National Co., with a capital stock of $1,000,000. William R. Diemer, president of the former company, is at the head of the new organization. Henry Streetman is vice-president and John C. McKisson, secretary-treasurer. The company will continue the manufacture of children's vehicles.

The Harrington Lock Co., Toledo, has been incorporated with a capital stock of $25,000 by Bert Harrington, Thomas L. Gifford, and others.

The American Magneto Co. will move its plant from Monroe, Mich., to Toledo and will occupy quarters at Fernwood Avenue and the New York Central Railroad. Some new equipment will be required.

The Taylor Welder Co., Warren, Ohio, has been incorporated with a capital stock of $10,000 by A. C. Taylor, A. E. Hackett and others.

The Dall Motor Parts Co., Vermilion, Ohio, has increased its capital stock from $35,000 to $100,000 and contemplates building extensions.

The Gramm-Bernstein Co., Lima, Ohio, has placed contracts for an addition 165 x 200 ft. to be used for assembly purposes and a paint shop. It is working on Liberty motor trucks and needs greater capacity.

The Sebring Tire & Rubber Co., Sebring, Ohio, will erect additions and install new equipment that will more than double its present capacity.

The Thomas & Armstrong Co., London, Ohio, will erect a new factory.

The Phoenix Electric Co., Mansfield, Ohio, will erect a one-story factory, 50 x 100 ft.

The National Pipe Die Machine Co., Archbold, Ohio, has reopened its plant and is manufacturing a line of pipe threading machines.

The Automatic Sprinkler Co. of America, Youngstown, Ohio, which contemplated an addition to its plant, has postponed it until the early part of next year.

The Elgin Tractor Co., Piqua, Ohio, will immediately commence the erection of the first unit of its new plant, 80 x 220 ft., to cost about $50,000. Contracts have been let.

Cincinnati

CINCINNATI, Nov. 26.

Co-operation in this section by manufacturers and the Government has now reached the point where it is nearly 100 per cent perfect. The Cincinnati branch of the National Metal Trades Association, of which A. H. Tuechter is president and J. M. Manley secretary, has been especially active in rushing the production of machine tools that are needed directly or indirectly for Government work. The absence of labor troubles also reflects credit on workmen employed by the metal-working industries.

No new large lists of machine tools have been issued, but local firms are anticipating one from the Smith-Form-A-Truck Co., Chicago. According to current rumors this company expects to engage extensively in the manufacture of munitions. Reports are also in circulation that several Canadian firms are expecting rush orders for shells from both this and the French governments, and will need lathes especially to take the place of those now out of commission. Nothing definite can be learned of this, however. With the exception of small lathes and shaping machines, second-hand machine tools are very scarce and are being sold above the cost of new machines in many instances.

The John H. McGowan Co., Cincinnati, is inquiring for a vertical boring mill with a table 60-in. or under. It manufactures pumping machinery.

The Rapid Cooler Auto Radiator Co., Cincinnati, has been incorporated with $60,000 capital stock by J. B. Towler and others. Manufacturing plans have not yet been given out.

Hamilton, Ohio, contemplates adding to its municipal waterworks plant. No definite plans have as yet been decided on.

The Hamilton Machine Tool Co., Hamilton, Ohio, whose plant was recently out of commission a few days, due to trouble in its power plant, is now operating at full capacity.

The Liberty Tool & Production Co., Dayton, Ohio, has been organized and will be incorporated at an early date. Fred Stevens and Herbert L. Beeler, both formerly of the Stevens Mfg. Co., are the principal members of the new firm. It will make a specialty of tool and die work.

The Davis Sewing Machine Co., Dayton, Ohio, has issued an additional list of machine tools wanted that includes a number of large lathes, milling and small drilling machines.

The Dayton Metal Products Co., Dayton, Ohio, will build an addition to its plant on Taylor Street, estimated to cost $7,000. It will also add equipment to its electrical plant on Ludlow Avenue.

The John W. Brown Mfg. Co., Columbus, Ohio, maker of automobile lamps, is reported to be adding to its equipment for the purpose of taking on a Government munition contract.

The W. E. Lamneck Co., Columbus, has a contract for furnace fittings from the Government and is adding machinery. Thomas W. Pearson is general manager.

The Hardware Specialties Mfg. Co., 124-126 East High Street, Springfield, Ohio, has been incorporated with $10,000 capital stock. C. J. Tuttle is president and R. L. McIntire, secretary.

The Lunkenheimer Co., Cincinnati, manufacturer of engineering specialties, has acquired a 6-acre tract, adjoining its property, for extensions. No definite plans have been prepared for the additions.

Indianapolis

INDIANAPOLIS, Nov. 26.

The Colonial Broom Mfg. Co., Indianapolis, has been incorporated with $50,000 capital stock to manufacture brooms, brushes and novelties. The directors are E. E. Stokes, Perry M. Murphy and Samuel Lewis.

The Weidely Motors Mfg. Co., Indianapolis, has increased its capital stock from $600,000 to $1,100,000, made necessary, it is said, by a $3,000,000 contract with the Cleveland Tractor Co. to manufacture motors. New machinery to be purchased, it is estimated, will cost about $70,000.

The National Fuel Saving Co., Evansville, Ind., has been incorporated with $50,000 capital stock to manufacture smoke consuming devices. The directors are Henry C. Kleymeyer, William A. Koch, Alfred A. Klein, John D. Craft and Morton Mannheimer.

The H. E. Miller Mfg. Co., Indianapolis, has been incorporated with $25,000 capital stock to manufacture permutation hasp locks and other articles. The directors are H. E. and M. Miller and R. D. Burress.

The Wagner Axle Co., Anderson, Ind., has a Government contract amounting to $4,000,000 and will increase its floor space to 280,000 sq. ft. and add new equipment.

The Pittsburgh Model Gas Engine Co., Peru, Ind., has purchased $50,000 worth of machinery and will increase its force by 100 to 125 men. It has received Government orders through the Baldwin Locomotive Works.

The Central South

LOUISVILLE, KY., Nov. 26.

An increasing demand for electric motors is a feature of the local market. With coal scarce the motor offers a ready solution to the problem of additional power, wherever central station service is available. Second-hand equipment is in good demand and generally selling at a premium. Structural iron foundry companies report a brisk business.

The Reciprocating Electric Tool Co., Louisville, has been incorporated with capital stock of $100,000 by J. J. Roberts, James K. Jarvis, F. L. Robinson and J. D. Kean. It will buy parts for electrical drilling and riveting tools, to be made in all sizes, and assemble them in Louisville. Later a factory will be erected to manufacture the parts. J. J. Roberts, 412 Courier-Journal Office Building, Louisville, may be addressed.

The Roy C. Whayne Supply Co., Louisville, is in the market for two low pressure, belt or steam driven air compressors, with a capacity of about 900 cu. ft. each, with air lock; also for two double-driven engines, with drums side by side.

The Continental Car Co. of America, Louisville, is in the market for a 6 to 10-ton alternating-current electric hoist, 220 volts, to operate on a 12-in. I-beam.

Paul J. Mahoney, Glasgow Junction, Ky., is in the market for a 25-hp. boiler and a No. 25 to 27 Star well-drilling rig.

W. C. Daniels & Sons, Whitesburg, Ky., will make improvements to their electric lighting plant to cost several thousand dollars.

The Southern Machinery Exchange, Somerset, Ky., is in the market for a 5-hp., 220-volt, single-phase motor, any speed.

The Darling Air Craft Co., Louisville, has been incor-

porated with capital stock of $25,000 by Omer F. Darling, Henry T. Kraft and Clem W. Huggins, Inter-Southern Building. It contemplates assembling airplanes and later may erect a factory.

The Frick-Lindsey Co., Winchester, Ky., is preparing to establish a shop for working over oil-well casings and other piping, and will install re-threading and cutting machinery.

The Gallatin Buggy & Implement Co., Gallatin, Tenn., has increased its capital from $5,000 to $15,000. S. T. Ramsey, W. B. Echols and J. T. Durham are directors.

The Barker Lumber Co., American National Bank Building, Knoxville, Tenn., contemplates development of sand mines and requires machinery for mining and lifting sand vertically 25 ft., using steam pumps, nozzles and elevating machinery to handle up to 5000 yd. per day.

The Loping Horse & Novelty Co., Huntington, W. Va., has been incorporated with capital stock of $25,000 and will establish a factory. Drill presses, iron bending and wire-wheel making machinery are required. George L. Summers is president, and P. M. Hayes, manager.

Texas

AUSTIN, Nov. 24.

The machinery and tool trades have been stimulated by recent rains covering most of the drought stricken area of the State. There is an unusually large demand for small tools.

The Petroleum Refining Co., Houston, will build a machine shop, carpenter shop and install a steam plant in connection with its oil refinery which it is constructing at a cost of about $1,000,000. It will have a daily capacity of 15,000 bbl.

J. F. Christian will rebuild his cotton compress at Lufkin recently wrecked by an explosion. It will be of larger capacity than the one destroyed.

The Big Four Ice Co., Waco, will enlarge its plant by installing a 50-ton electrically driven ice machine. It will also build a 3000-ton cold storage plant and install an automatic stoker. The total cost of the improvements will be $50,000.

Catalogs Wanted

The San Antonio Machine & Supply Co., San Antonio, Tex., desires catalogs of machinery and factory and mill supplies, together with price lists and discount sheets.

California

LOS ANGELES, Nov. 20.

The American Can Co., Los Angeles, is planning for the erection of an addition, 124 x 392 ft., to its plant at Forty-eighth Street and Santa Fe Avenue, Vernon, to cost about $1,100,000. It is proposed to build a series of units to increase the capacity to over 2,000,000 cans in a 24-hr. day. C. J. Gordon is local sales manager.

The Crawford & Saunders Aircraft Co., Los Angeles, has been incorporated with a capital of $200,000 to manufacture airplanes. Harry J. Crawford, 2120 South Third Street, Santa Monica; Leslie R. Saunders, 903 West Thirty-seventh Street, Los Angeles, and John G. Harrah, 3815 Ocean Front, Venice, are the incorporators.

The Pacific Fire Extinguisher Co., Los Angeles, has acquired property at 125 East Ninth Street for the manufacture of a patented fire alarm attachment.

The Oldfield Tire Co., Los Angeles, has been incorporated with a capital of $50,000 to manufacture automobile tires. The incorporators are Barney Oldfield and R. R. Colby, Los Angeles, and Frank L. Chance, Glendora.

The California Aviation Co., Los Angeles, is operating at capacity for the manufacture of airplanes for Government service. In connection with expansion of the works the company has received an offer to establish a plant at Portland, Ore. Earle Remington is general manager.

The San Francisco Bridge Co., San Francisco, has leased property at the corner of Fifteenth and Mateo streets, Los Angeles, and will establish a plant for the manufacture of fire briquets.

The Cementograph Co., 1084 West Thirty-ninth Place, Los Angeles, has been organized to manufacture imitation tiles. Harry J. DeTurck, 468 North Lake Street, and William F. Walling, 219 East Thirtieth Street, head the company.

The Republic Motor Truck Co., Alma, Mich., is reported to be considering the erection of new assembling works at San Francisco. It recently acquired property on Santa Fe Avenue, Los Angeles, for about $125,000 for the construction of a similar plant.

Fire, Nov. 17, destroyed a portion of the plant of the J. H. McMaster Machinery Co., San Francisco.

The Pacific Northwest

SEATTLE, WASH., Nov. 20.

Machine shops and foundries are working to capacity in an effort to keep up with the demand for tools and equipment. Many new plants are under construction in this section, and practically every foundry and repair shop has made or is making improvements and extensions. A good demand exists for second-hand tools, which are extremely scarce and are picked up as rapidly as they are put on the market.

Barton & Co., Seattle, have purchased a 15-acre tract, on which will be erected a packing plant to cost $250,000.

It is reported the American Can Co., Vancouver, Wash., plans the construction of a plant on a 17-acre tract which it owns.

The Collier Harvesting Co., Aberdeen, Wash., recently incorporated for $200,000 by J. F. Collier and M. J. Keating, plans the construction of a factory for the manufacture of a harvesting machine.

The Perine Machinery Co., Seattle, has increased its capital stock from $25,000 to $50,000.

The Harbor Island Mfg. Co., Inc., Seattle, is rushing work on the construction of its new sawmill on Harbor Island, which will have a daily capacity of 50,000 ft. and will specialize in shipbuilding lumber.

The Gardiner Mill Co., Roseburg, Ore., W. H. Jewett, owner, has completed plans for rebuilding its sawmill recently destroyed by fire. It will have a daily capacity of 75,000 ft.

The Valveless Pump & Foundry Company, Portland, Ore., has leased the former plant of the Portland Stove Works, which it is equipping for a foundry and machine shop. The first unit of the foundry has been placed in operation, and work on the machine shop and a second blast furnace will start at once. Its patented valveless pump has been manufactured on contract, but this will be one of the features of the new plant. M. L. Jones is president and T. H. Beverly, secretary.

The Salmon Bay Foundry Co., Inc., Seattle, has recently installed a new 20-ton furnace, 10-ton stationary crane, a mixer and new unit for cleaners, increasing its capacity more than 300 per cent in the past year. It makes a specialty of machinery and ship iron castings.

L. J. Simpson, North Bend, Ore., states that a syndicate will install a plant on Coos Bay, near North Bend, for the manufacture of box cars and finished airplane stock.

Canada

TORONTO, Nov. 26.

The American Steel Products Corporation, Brantford, Ont., has been organized with a capital stock of $1,000,000. It will take over the Dominion Steel Products Co., and it is reported that the capacity of the latter plant, which is manufacturing a line of propelling shafting, will be doubled. The officers are W. P. Kellett, president; D. O. Johnston, vice-president; M. M. McGraw, treasurer; P. H. Secord, secretary, and W. S. Brewster, all of Brantford, and W. S. Tomlinson, Toronto.

The International Shipbuilding Corporation, New Castle, N. B., has commenced the erection of a plant at Nordin, N. B., for building wooden vessels.

The Dussault Co., Levis, Que., has completed arrangements for the erection of a machine shop, and construction will begin at once. Equipment will be purchased.

The Gray Marine Motor Co., Bridgewater, N. S., proposes to build a manufacturing plant there.

The Winnipeg Tool & Forging Co., Winnipeg, is being reorganized. It manufactures a special line of mechanical tools, wrecking bars, etc.

The Kent Shipbuilding Co., St. John, N. B., is interested in a company which proposes to build a shipbuilding plant at Tuft's Cove, near Dartmouth, N. S.

Gauvin & Beauchemin, civil engineers, Quebec, are preparing plans and specifications for power development at Armagy, Que., County Bellechasse, on Ricer Fourche-de-Nord-Ouest, and will receive bids for water turbines, dynamos, sluice gates, etc.

The City Council, Brantford, Ont., will receive bids for a 40 hp., 25 cycle induction motor for the sewage pumping station.

The City Council, Lethbridge, Alberta, will install a new turbo-generator and other power plant equipment to cost $65,000.

G. A. Roy of G. A. Roy, Ltd., Bagot, Que., is interested in a company which will erect a plant at St. Hyacinthe, Que., at a cost of about $60,000, to manufacture caskets and casket hardware.

The Holmes Foundry Co., Sarnia, Ont., recently incor-

porated, will build a plant, construction to be started at an early date.

The St. Andrews Wire Works of Canada, Ltd., Orillia, Ont., has secured a building at Strathroy, Ont., which it will remodel and equip for the manufacture of wire products, etc. G. M. Haldane is local manager.

The plant of the Mueller Mfg. Co., Ltd., Sarnia, Ont., which is being erected at Port Huron, is progressing rapidly, and plans are being prepared for a power house, 60 x 100 ft. When completed the plant will represent an investment of $400,000. James, Loudon & Hertzberg, Ltd., Toronto, Ont., are the consulting engineers.

J. A. Gregory, St. John, N. B., proposes to establish shipyards at St. George, N. B., to cost about $100,000.

The K. & S. Canadian Tires, Ltd., 527 Yonge Street, Toronto, will build a factory at Weston, Ont., 70 x 150 ft., to cost $60,000.

John Clement and C. H. Moineau, directors of La Campagnie de Breton Special, Three Rivers, Que., who are erecting a factory at a cost of $30,000, are in the market for boilers, engines, stack, belting, etc.

The forge shop at St. Anthony, N. B., owned by Philip Melanson, was completely destroyed by fire with a loss of $25,000.

The building at Niagara Falls, Ont., jointly occupied by the Davis-Bournonville Co. and the Davis Acetylene Co., has been taken over by the former company and will be operated exclusively for the manufacture of oxy-acetylene apparatus for the Canadian trade.

The Canadian Appliance Co., Ltd., Montreal, has been incorporated with a capital stock of $25,000 by Waldo W. Skinner, William G. Pugsley, George G. Hyde, and others, to manufacture equipment, appliances and specialties for railroads cars, machinery, tools, etc.

The Harrington Pick & Tool Co., Ltd., Toronto, has been incorporated with a capital stock of $50,000 by Frank S. Harrington, New York; John M. Blackhall, William P. Crow, 1353 Bathurst Street, Toronto, and others to manufacture tools, machinery, implements, etc.

La Compagnie d'Engin-Turbine Revolution, Limited, Montreal, has been incorporated with a capital stock of $100,000 by Charles J. E. Charbonneau, Dominique Pelletier and John Clement, all of Montreal; Bernard Melancon, Outremont, Que., and others to manufacture engines, motors, machinery, aeroplanes, automobiles, etc.

The Dominion Shipbuilding Co., Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by John M. Bullen, 44 King Street West; Harold L. Steele, 437 Broadview Avenue; James H. Fraser and others. It has secured a site and will soon commence the construction of a plant for building steel ships.

E. Langham, general purchasing agent, Canadian Northern Railway, Toronto, is in the market for two lathes with 24-in. swing, 8 to 12-ft. bed. Offers should be submitted with cuts and full description.

Pratt & Whitney, Dundas, Ont., machinery and tool manufacturers, have awarded contracts for the erection of a plant and office building to cost $200,000.

W. W. Porter, Detroit, is looking for a site at St. Mary's, Ont., where he proposes to build a plant for the manufacture of farm tractors.

Robert H. Hassler, Ltd., Indianapolis, Ind., manufacturer of shock absorbers for Ford cars, has decided to locate its Canadian factory at Hamilton, Ont. A building has been leased and operations will be started immediately. J. C. Piper will be managing director of the Canadian company.

Catalogs Wanted

The Cluff Ammunition Co., Ltd., Atlantic Avenue, Toronto, desires catalogs of equipment for a forging plant.

Government Purchases

WASHINGTON, Nov. 26.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, opening date unassigned, schedule 1581, for 72 motor generator sets, for various deliveries; opening date Dec. 18, schedule 1570, one 4-ft. plain radial drill, one tool grinder, five 5-ft. bed, 12-in., universal high-duty engine lathes, and one 12-ft. bed, 16-in. engine lathe, all for San Diego, Cal; opening date unassigned, schedule 1582, for five engine lathes for Annapolis, Md.

Bids will be received at the Bureau of Yards and Docks, Navy Department, Washington, until 11 o'clock a. m. Dec. 10, for providing and installing on the runway rails two 6-ton, 2-trolley, 5-motor bridge traveling cranes and one 3-ton swinging jib crane in the new galvanizing plant at the United States Navy Yard, Philadelphia, drawing and specification No. 2699. Bids will also be received until 11 o'clock a. m. Dec. 10, for providing and installing on the runway rails one 5-ton, 3-motor bridge crane, one 2-ton hand-operated bridge crane and one 1-ton hand-operated bridge crane in the machine shop at the submarine base, New London, Conn., specification No. 2701.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, Nov. 16, for furnishing material and supplies for the naval service, as follows:

Schedule 2150½, steam engineering, class 31, Norfolk—One milling machine, duplex swivel head and one set cutters—Bid, 42, $10,030.20. Class 32—One horizontal spindle removable-housing milling machine and one set cutters—Bid 42, $10,173.50. Class 33—One 4-head adjustable-rail milling machine and one set cutters—Bid 42, $18,040.60.

Schedule 2276½, steam engineering; class 197, Philadelphia—13 toolroom engine lathes, back geared, screw cutting, motor driven—Bid 48, $972.75; 53, $1,454, $1,334, $1,220, $1,253, $1,299, and $1,177; 68, $953; 71, $1,095 and $850, alt.; 88, $1,360 and $1,370, alt.; 93, $1,629.50, $1,991.50, $1,391.50, alternate, and $1,726.65, alternate.

Names of the bidders and the numbers by which they are designated in the above list follow:

Bid 42, Ingersoll Milling Machine Co., Rockford, Ill.; 48, Monarch Machine Tool Co., Sidney, Ohio; 68, Philip Smith Mfg. Co., Sidney, Ohio; 71, W. E. Shipley Machine Co., Philadelphia; 88, Fairbanks Co., New York; 93, Manning, Maxwell & Moore, Inc., New York.

NEW TRADE PUBLICATIONS

Milled Screws.—Standard Pressed Steel Co., Twentieth and Clearfield streets, Philadelphia. Catalog. Illustrates, describes and lists an extensive line of milled screws with the V, United States standard or Whitworth threads. These include hollow and headed set screws, the latter with various styles of points, and cap screws with different kinds of heads. Mention is made of a line of shafting hangers and a cold-rolled steel collar for use with hollow or countersunk set screws. A number of tables of useful information are included.

Wood Screw Machinery.—Asa S. Cook Co., Hartford, Conn. Catalog. Shows a line of machinery for the manufacture of wood screws. The machines are arranged in the catalog in the order in which they are used in a plant. The method of manufacturing the screws is briefly described and data on the equipment and the force of operators required are included. For the most part a pair of pages is given to each of the machines, with a brief description on one and an illustration and table of the sizes that can be supplied on the other.

Elevating Trucks.—Barrett-Cravens Co., Transportation Building, Chicago. Folder. Treats of the use of elevating trucks in corerooms to lower the cost and increase the amount of production. The folder is a reprint of a portion of an article which appeared in THE IRON AGE, Oct. 11, 1917. An illustration of a truck handling a number of core racks supplements the text matter.

Steel Pulleys.—American Pulley Co., 4200 Wissahickon Avenue, Philadelphia. Booklet entitled, "Getting Maximum Pulley Efficiency." Points out briefly and in a non-technical way some vital facts regarding the efficiency of pulleys. The points to be considered in buying belt pulleys are listed and wood, cast iron and steel pulleys are compared from the viewpoint of transmission of power and service. These facts are supplemented by a brief description of the construction of the company's split steel pulleys and the results of a number of tests that have been made are included.

Reinforced Concrete Construction.—Turner Construction Co., 244 Madison Avenue, New York. Circular. Illustrates the 70 buildings erected by the company in 1916. These include factories, warehouses, office buildings, pier sheds, etc. Data on the quantity of material used and the length of time required to complete the buildings are presented. In the view of this city all of the different structures are numbered to correspond with the list showing the owner and the location of the building.

Tumbling Barrels and Dust Arresters.—Whiting Foundry Equipment Co., Harvey, Ill. Catalog No. 132, superseding No. 120. Pertains to a line of tumbling barrels that are made in a great variety of sizes and shapes. Illustrations of the different barrels are presented together with tables of the sizes in which they can be supplied. Mention is made of a line of dry and water cinder mills for recovering iron. A dust arrester with a screen cleaning device which was illustrated in THE IRON AGE, Aug. 5, 1915, is also featured. Several views showing tumbling barrels and the dust arrester in use are given.